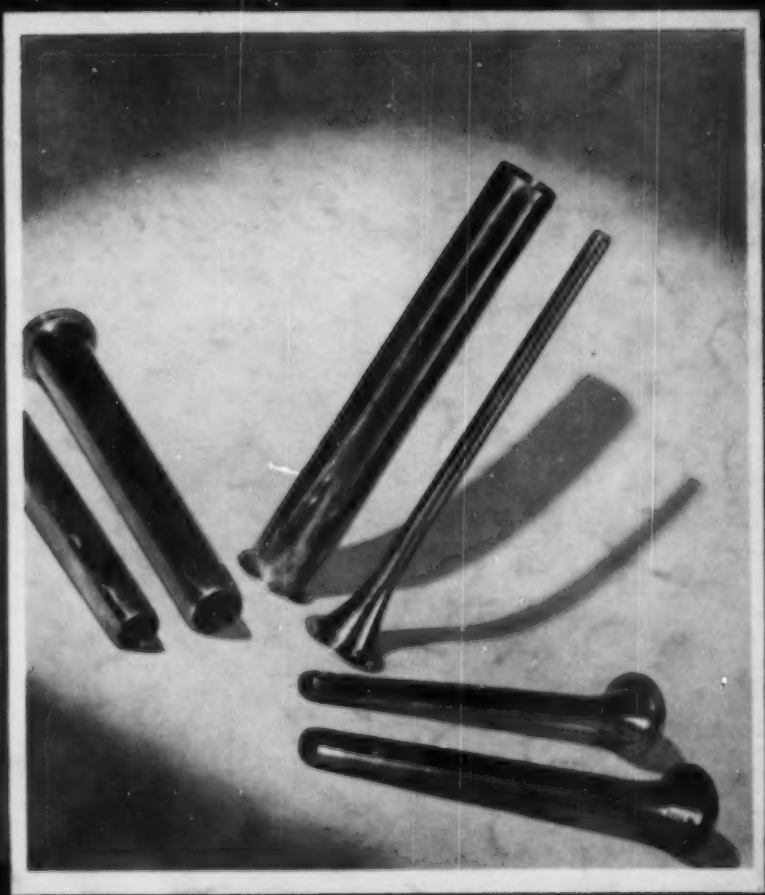
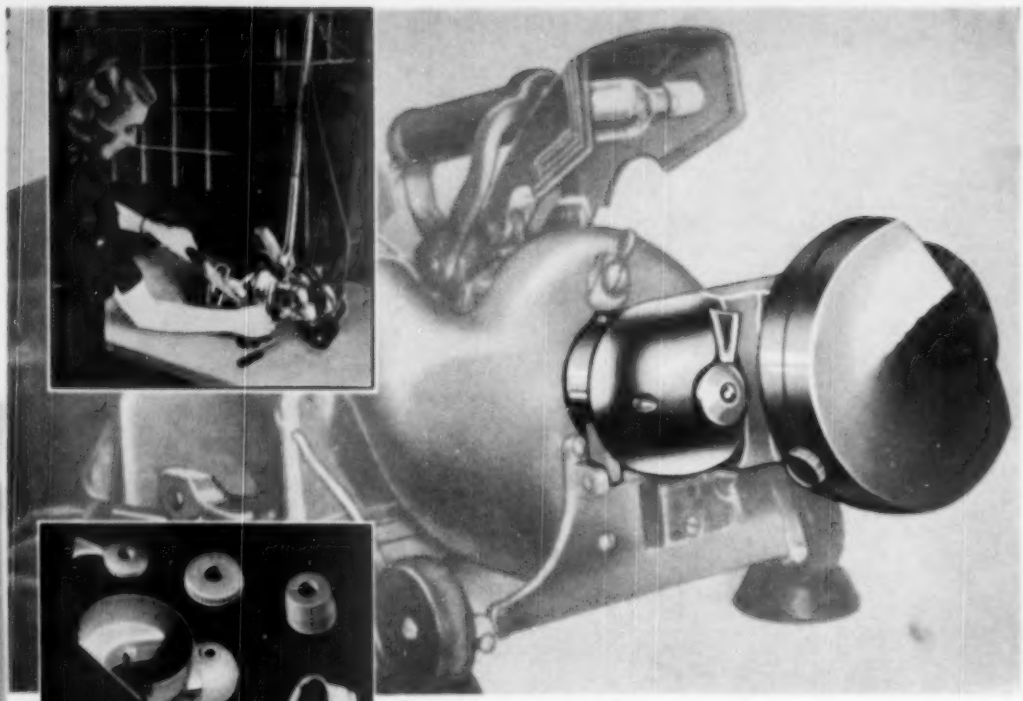
# DIE CASTINGS

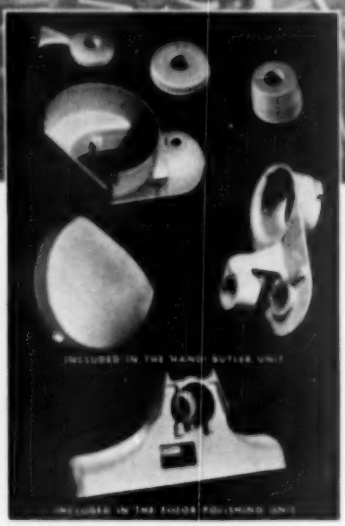
INCLUDING A SPECIAL FINISHING SECTION

March, 1950



THE PRODUCT DESIGN MAGAZINE FOR USERS AND POTENTIAL USERS OF DIE CASTINGS





# "Bonus" Performance!

With the complete Kirby Home Sanitation System, which includes the Handi-Butler Housekeeping and Floor Polishing Units it's just like having a perfectly trained servant in the house. The result? Cleaner, more sanitary walls, floors, floor coverings, draperies, bedding . . . plus an entire kit of power-operated tools that buff, sand, polish, wax, sharpen . . . perform a host of necessary household maintenance tasks. *That's Kirby "Bonus" Performance.*

Monarch offers "plus" performance, too. For example, there are the 7 aluminum die castings included in the Handi-Butler and Floor Polishing Units. Each had to be dimensionally accurate to fit quickly and easily into position . . . strong to withstand vibration and other functional strains . . . attractive to match the overall beauty of the entire Kirby System. Monarch's 37-year-proved methods met every specified requirement accurately and economically. *That's Monarch "Bonus" Performance!*

Have you a casting problem? If so, ask us for complete data on Monarch permanent mold, aluminum and zinc die castings.

## 4 REASONS WHY

The Scott and Fetzer Company, Cleveland, Ohio chose Monarch aluminum die castings for the Handi-Butler and Floor Polishing units of the Kirby Home Sanitation System.

- PRECISION-ENGINEERING
- MAXIMUM STRENGTH
- ATTRACTIVE APPEARANCE
- COMPETITIVE PRICE

## NEW SERIES OF 12 TECHNICAL BULLETINS

Edited for design and production engineers by Monarch's chief engineer, these fact-packed bulletins, issued monthly, discuss vitally important phases of the permanent mold and die casting processes. Upon request these bulletins will be addressed to your personal attention.

**MONARCH ALUMINUM MFG. COMPANY** • Detroit Avenue at West 93rd Street, Cleveland 2, Ohio

## If You Are *Designing* a New Product Or *Re-styling* an Old One . . .

## *Schultz Engineers* Would Like to Point Out The Advantages of DIE CASTING!

Manufacturers interested in knowing more about die casting and the dies and tools employed are invited to consult us before a design has progressed to a point where it cannot be altered readily.

Often slight changes in the design of a part will make it unusually suitable for production by the economical die casting process, without sacrificing the essential requirements of the part.

As a leading supplier of highest quality zinc alloy die castings, we have a wealth of experience which is available to designers without obligation.

If your production will benefit by die casting we will point out the advantages. By the same token, if die casting appears impracticable we will tell you so frankly.

**SCHULTZ DIE CASTING COMPANY**

**1810 CLINTON STREET • TOLEDO 7, OHIO**

**MARCH 1950**
**Vol. 8 No. 3**

# DIE CASTINGS

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Los Angeles 17, California
Tucker 6703

COVER—Six sizes of flanged tubes 10½" long and ranging as small as 5/16" in diameter are being die cast in aluminum for use with sausage stuffing machines. Article on page 36.

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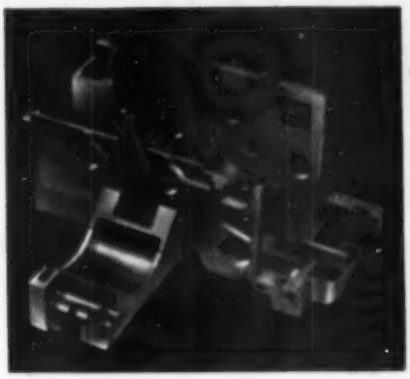
Acceptance under Section 34.64 P. L. & R. authorized.

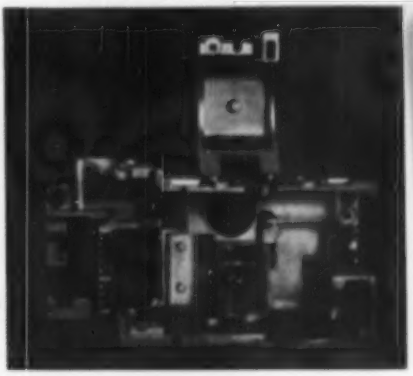
# MAGNESIUM DIE CASTINGS

## "They're priced competitively"

Magnesium die castings can improve your product! And you don't have to pay a premium to get the advantages offered by magnesium. In most cases *Dow magnesium die castings are competitive with those in other metals* and in some cases they are cheaper. Use this established die casting material for your product. A wide range of applications in many different fields has proved magnesium die castings sound and economical.



hold slots to ±0.001" with no taper?



## *Dow can do it in Magnesium!*

Design requirements for this teletype bracket frame were tough. To eliminate some costly machining operations, it was desired to cast the numerous slots without taper and to hold tolerances in the slots to ±0.001". In addition, all holes in the casting were to be produced by coring. As cast in magnesium, the brackets met these stiff requirements.

Magnesium alloys don't solder to the die. This makes it possible to cast small cored holes and slots without taper. Dimensional accuracy can be maintained at a high level because magnesium alloys don't "creep" or "grow". Magnesium's unequalled machinability makes any required machining fast and economical. And a high strength-weight ratio allows strong, rigid design at minimum weight.

If you have a die casting application, write to Dow. Find out how Dow magnesium die castings can improve your product, cut its cost, make it easier to sell. Use Dow's production facilities for quality die castings at competitive prices.

*Write to Dept. MG5*

*Magnesium Division*

**THE DOW CHEMICAL COMPANY**

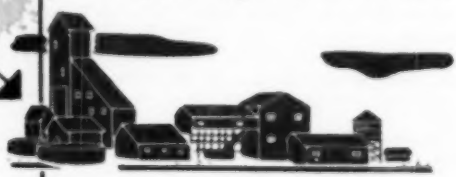
MIDLAND, MICHIGAN

New York • Boston • Philadelphia • Washington • Atlanta
Cleveland • Detroit • Chicago • St. Louis • Houston
San Francisco • Los Angeles • Seattle
Dow Chemical of Canada, Limited, Toronto, Canada

# American Electrolytic

## 99.99+% slab zinc

a reliable source for die casting requirements



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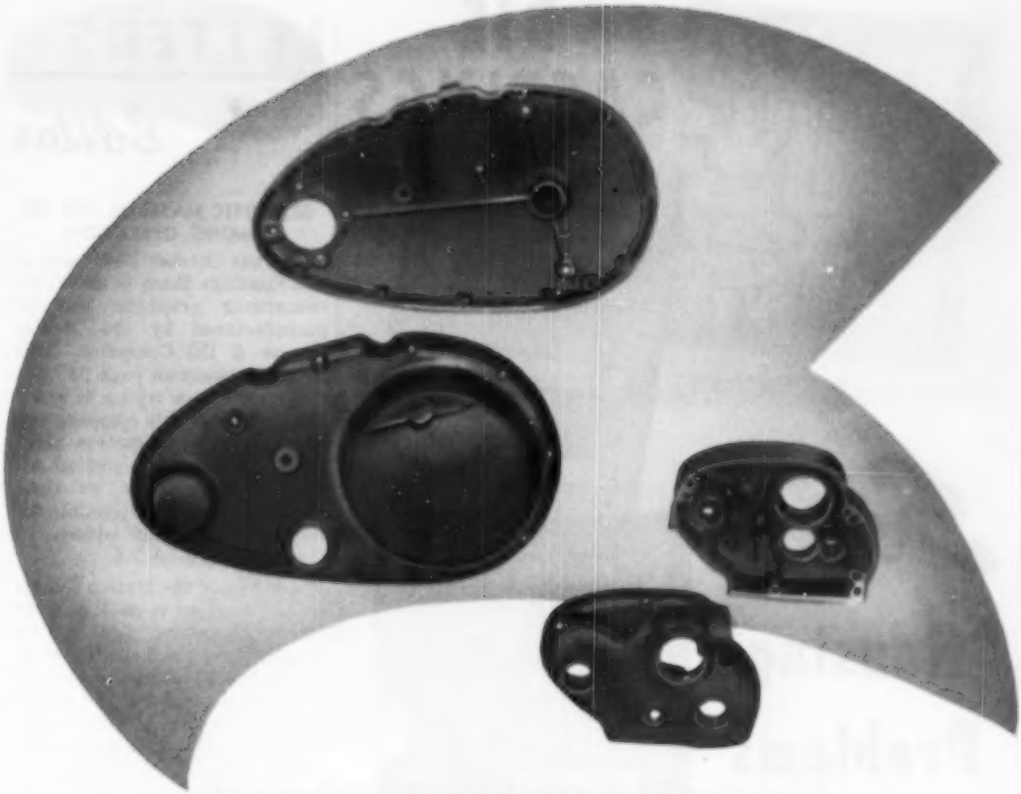

## ANOTHER HAPPY ENDING

This is another short story in Parker's history of designing die castings to meet difficult requirements . . . and it, too, has a happy ending.

A short time ago a prominent cycle manufacturer brought Parker his problem. Our engineers discussed it and designed a die casting which met all specifications as to alloy, design, and economy of production at worthwhile savings.

Shown above are the four aluminum die castings which were the result of a consultation with Parker. It pays to confer with Parker early in the development of die cast parts.

*Write for our book* on *Parker Facilities.*

PARKER WHITE-METAL CO. • 2144 McKINLEY AVENUE • ERIE, PENNSYLVANIA

R. T. BLOOMQUIST, Bellefonte, Penna. . . . O. J. BERGER, Room 1415, 139 N. Clark Street, Chicago 2, Ill. . . . O. H. BROETERMAN, 1499 Elm Street, Cincinnati, Ohio . . . T. W. JOHNSON, Hillside Road, 7 Hills Village, Cleveland, Ohio . . . VAN ARSDELL & HODGSON, 308 Machinery Bldg., Detroit 11, Mich. . . . G. L. PALMER, 97 Spring St., Metuchen, N. J. . . . J. C. PALMER, 3577 Monroe Ave., Pittsford, N. Y. . . . H. R. LaMONTAGNE, P. O. Box 969, Springfield, Mass. . . . EDWARD F. HIGGINS, Jr., 4931 Lucinda Avenue, St. Louis, Missouri.

**PARKER** ALUMINUM *and* ZINC *Die Castings*

# DIE CASTINGS by Milwaukee

## Solve "Housing" Problems

This strong but intricate die cast housing for a delicate 3-shift counting device is but one of many such housings or cases produced efficiently at low cost with the aid of Milwaukee designers and technicians. Note the cast-in lugs, holes, slots and lettering.

Since the early days of the die casting industry, MILWAUKEE has produced housings for a wide variety of devices such as electric motors, motor controls, temperature controls, gear assemblies, recorders, outboard motors, electric appliances and others too numerous to mention.

The experience and knowledge gained in designing and producing die cast housings, cases and assembly panels for others is *at your service* . . . at MILWAUKEE . . . when you are faced with a "housing" problem.

**MILWAUKEE DIE CASTING COMPANY**
1019 N. FOURTH STREET • MILWAUKEE 3, WISCONSIN

A 5747-2/5


# LETTERS to the Editor

### GRAPHITIC MATERIAL FOR DIE SINKING OPERATION

In your October 1949 issue of Die Castings there is an article concerning graphitic material manufactured by the Mealey Grease & Oil Company. This article appears on page 24.

We have been trying to locate the address of this company but so far have had no success. Since we are interested in getting additional information on their product, would it be possible for you to give us the address of this company?—A.J.S.

*Address of the Mealey Grease & Oil Company is 2945 East 83 Street, Cleveland, Ohio. The graphitic material mentioned in the article is used as a coating on plaster models. A stylus, when in contact with the graphitic coating, sets up an electric current that is amplified into a buzzing signal that guides the diemaker in milling a die cavity to duplicate the plaster model.—Ed.*

### TEAR SHEETS

Several articles which would be very helpful to us appeared in Die Castings before we became subscribers. We would be obliged if you could send a tear sheet of the following:

"Thread Cutting Screws", February 1947 issue; "Production Clinic for Finishing Die Castings", December 1947; "Simple Dip Finish", December 1947; "Surface Preparation Procedures", October, 1946—N.S.N. (England.)

*Tear sheets have been forwarded.—Ed.*

### IMPROVED FABRICATION

I am very much interested in the portable dishwasher which was described in the article "Improved Method of Fabrication" which appeared in the January 1950 issue of Die Cast-

(Continued on Page 70)

# NEED ALUMINUM DIE CASTINGS?

**Alcoa's 2 modern plants**

(GARWOOD, N. J. • CHICAGO, ILL.)

**make the best you can buy**

## for example . . .

One of Alcoa's modern plants die casts these juicers by the thousands. Why? Because they produce sound, on-grade castings at exceptionally low prices.

If your products can use corrosion resistance—light weight—dimensional stability, specify aluminum. Whether the quantity is large or small, the design complex or simple, specify Alcoa Aluminum Die Castings.

A prompt quotation and engineer's handbook is available from your local Alcoa Sales Office. Call there or write ALUMINUM COMPANY OF AMERICA, 1895C Gulf Building, Pittsburgh 19, Pennsylvania.

**ALCOA DIE CASTINGS**

ALCOA ALUMINUM

INGOT • SHEET & PLATE • SHAPES, ROLLED & EXTRUDED • WIRE • ROD • BAR • TUBING • PIPE • SAND, DIE & PERMANENT MOLD CASTINGS • FORGINGS • IMPACT EXTRUSIONS
ELECTRICAL CONDUCTORS • SCREW MACHINE PRODUCTS • FABRICATED PRODUCTS • FASTENERS • FOIL • ALUMINUM PIGMENTS • MAGNESIUM PRODUCTS

# The meaning of a signature!

Through a quarter of a century of knowing how, the Super Cast reputation for Better Methods—Better Die Castings, has been recognized.

Sound engineering, metallurgical knowledge and skilled techniques have achieved and maintained a standard of superior quality.

Super Cast has kept faith, always deserving the mark it bears. Super Cast means die castings for those who want the best.

A sound, time-tested institution and a sound time-tested product have won confidence and widespread endorsement.

**THE SUPERIOR DIE CASTING COMPANY**

1001 London Road CLEVELAND 10, OHIO

Detroit Chicago Pittsburgh


## LITERATURE AND SERVICES OFFERED IN THIS MONTH'S ADS

NOTE: Circle numbers on the enclosed postcard to indicate literature, samples or trial services you wish to receive.

A-1. ENTHONE INC. Step by step instructions along with pertinent literature are offered by Enthone on the use of their metal stripper, Ebanol blackening processes, emulsion cleaner, and enamel strippers for die cast parts.

A-2. MONARCH ALUMINUM CO. A new series of 12 monthly technical bulletins edited by Monarch's chief engineer for design and production engineers is now available.

A-3. DETROIT POWER SCREWDRIVER CO. Catalogs on the use of Detroit Power hopper-fed machines for assembly work can be had. Production estimates will be made on receipt of sample assemblies by the company.

A-4. E. M. SCOTT CHEMICAL CO. Samples of No Weld, a die lubricant concentrate compounded for aluminum die castings, are available.

A-5. MITCHELL-BRADFORD CHEMICAL CO. A catalog explaining the company's Black Magic process for putting black finishes on zinc die castings is available.

A-6. LITEMETAL DICAST INC. Many new uses for aluminum and magnesium die castings are described in literature giving design case histories.

A-7. MAAS AND WALDSTEIN CO. Technical Data Bulletin 110 offers information on the use of fast-drying Dulac Clear Universal Lacquer No. 462 as a protective covering on metals.

A-8. ACROMARK CO. Literature is presented on hand and motor driven models of the Acroprinter, a machine for filling recessed letters and designs on die cast parts with enamel.

A-9. ROTO-FINISH CO. Information on the use of Roto-Finish barrel tumbling processes to finish die cast parts is available. Information concerning sample processing and a processing report can also be had.

A-10. PRECISE PRODUCTS CO. A circular is offered on the use of the Precise Super 40, an all-purpose portable hand grinder which, with attachments, can also be used on lathes and mills.

A-11. APEX SMELTING CO. A booklet on die casting alloys including aluminum, magnesium, and zinc will be sent upon request.

A-12. PARKER WHITE METAL CO. The company offers a book on its facilities in the aluminum and zinc die casting field.

A-13. AMERICAN SMELTING AND REFINING CO. Basic information on the use of aluminum alloys in the die casting fields, including sections on aluminum metallurgy, alloy specifications, and foundry practices, is contained in "Aluminum Casting Alloys," a booklet issued by the Federated Metals Division.

A-14. DU-LITE CHEMICAL CORP. Details concerning the company's offer to process sample die cast parts with its No. 72 degreaser and cleaner and to recommend proper procedures for cleaning are announced.

A-15. WAGNER BROS., INC. The company offers a bulletin on the use of Vander Wal-Wagner Applimatics, which apply buffing compounds automatically and in correct amounts so as to reduce wear on buffs and save compound.

(Continued on Page 49)

Irving L. Bambrick
Boston, Massachusetts
Commonwealth 6-7864

Albert J. Cox Company
Chicago, Illinois
Franklin 7-4093

John D. Goodue
Indianapolis, Indiana
Talbot 9345

Ralph E. Zimmermann
Detroit, Michigan
Trinity 5-7474

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die castings
ZINC AND ALUMINUM ALLOYS
CLEVELAND 19, OHIO

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Rochester, New York
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Lucas 3155

Manufacturers Sales Corp.
Dayton, Ohio
Melrose 3-6905

# SPEED!

## Only ZINC DIE CASTINGS OFFER THE LOW COST OF THE FASTEST DIE CASTING MACHINES

### 1800 CASTINGS PER HOUR →

This is a plunger machine—the fastest die casting machine there is. It is turning out "gates" of 4 castings at a rate of 450 per hour—2 pairs of automobile horn bodies per "gate"—1800 ZINC die castings per hour. Of the most used die casting metals, *only ZINC alloy can be cast in this high speed machine.*

### RAPID TRIMMING →

Since ZINC die castings can be produced with extreme complexity of shape, many castings require no machine work other than removal from the "gate" and trimming of flash. This is accomplished on the horn body "gate" in one motion of a punch press, as shown here. At each opening of the press, out fall 4 complete castings. The trimmed metal is not wasted, since it is remelted and used for subsequent castings.

### READY FOR ASSEMBLY →

As the castings come from the punch press they are ready for assembly. Here they are inspected and packed in cartons for shipment to the customer. It is easy to see why *die casting is the shortest distance between raw material and finished part.*

Speed of production is only one of many reasons why ZINC die castings are the most widely used. Every die casting company is equipped to make ZINC die castings and will be glad to discuss these reasons with you. Or write to us.

**ZINC**
FOR DIE CASTING ALLOYS

The New Jersey Zinc Company, 160 Front Street, New York 7, New York.

**The Research was done, the Alloys were developed, and most Die Castings are based on**

**HORSE HEAD SPECIAL (99.99 + % Uniform Quality) ZINC**

# DIE CASTING tunes in on...

## increased output
## lower production costs
## better products

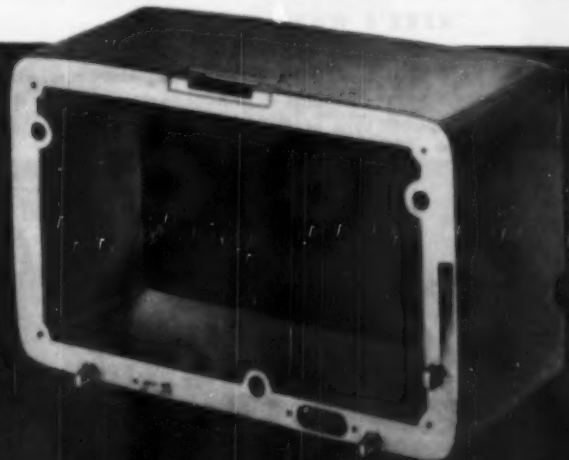
CASE HISTORIES FROM MT. VERNON FILES

The main housing for a new AC-DC-Battery portable radio posed a problem for the Garod Electronics Corporation. A sheet metal stamping was considered. This involved drawing, forming and punching, plus assembling of component parts. Lugs for hinges required riveting. After careful consideration, this construction was deemed impractical.

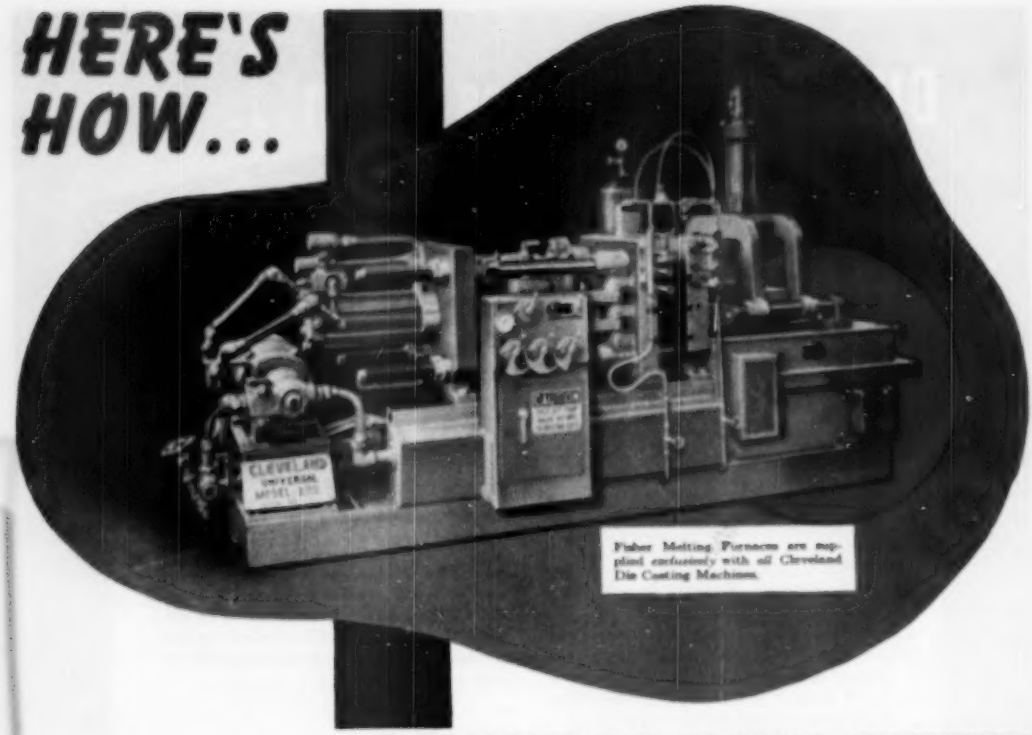
Die casting, therefore, was specified. Die cast in one piece, the housing is completely rigid. The entire unit, including apertures, bolt holes and lugs for hinges, is obtained in one production operation — as the die closes. And Mount Vernon supplies the casting so "clean" that it goes straight to the assembly bench without additional machining.

Yes, innumerable examples such as this prove that die casting is able to speak for itself — show you the way to increased output, superior products, lower unit costs. Whatever the item you manufacture, why not consult with us? We have a wealth of experience and specialized know-how. You may profit "to beat the band!"

**MT. VERNON**
DIE CASTING CORP.
MT VERNON NEW YORK



# HERE'S HOW...




Fisher Melting Furnaces are supplied *exclusively* with *all* Cleveland Die Casting Machines.

## ...CLEVELAND DIE CASTING MACHINES

# MELT METAL

Fisher Melting Furnaces are supplied *exclusively* with *all* die casting machines manufactured by Cleveland Automatic Machine Company. Fisher Melting Furnaces are *built-in* as an integral part of all Cleveland Automatic *zinc* die casting machines.

John Probuska, Vice President and Sales Manager of Cleveland Automatic Machine Company says: "We find it a distinct advantage to be able to supply our die casting machine customers with any type of melting furnace. It is important to our customers and ourselves that we can ship Cleveland Die Casting Machines as complete packaged units."

**HERE'S WHY...**

★ **Fisher builds every type of melting furnace**—oil, gas, electric or electric induction for melting aluminum, magnesium, zinc or brass. Thus Cleveland Automatic can supply with their die casting machines, the type of melting furnace best suited to their customer's individual requirements.

★ **The Fisher Service Department is nation-wide**—with Service Men permanently located in or near your city. Maintenance parts are easily and quickly secured.

★ **Fisher Furnaces are standard units**—not special furnaces. They are proven and trouble-free as a result of Fisher's 27 years experience in the manufacture of melting furnaces.

For detailed information on Fisher Furnaces write your nearest Fisher or Lindberg office.

## *Fisher Furnaces*

**A DIVISION OF LINDBERG ENGINEERING CO.**

**2463 West Hubbard Street, Chicago 12, Illinois**

*Aluminum and Zinc Base*

# DIE CASTINGS *by* PARAGON

AMERICAN DIE CASTING INSTITUTE
D
CI
MEMBER

**OVER 80,000 SQUARE FEET OF MODERN PLANT**

Here at PARAGON we have every facility, together with the man power, experience and engineering knowledge to handle your requirements in aluminum and zinc base die castings to your fullest satisfaction. *Inquiries are invited.*

# PARAGON

## DIE CASTING COMPANY

5853 West Dickens Avenue Chicago 39, Ill.

*SALES OFFICES*

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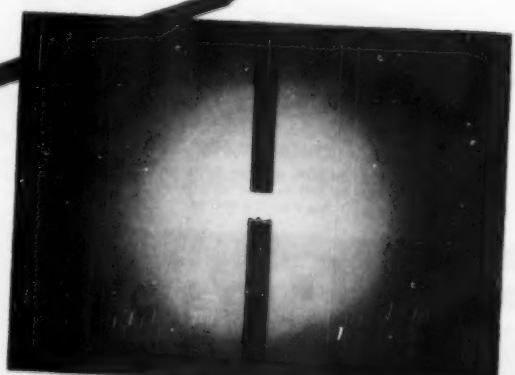
QUALITY
PARAGON
CAST
DIE CASTINGS

# *The* AMERICAN DIE CASTING INSTITUTE

is to be congratulated for providing industry with a metallurgical yardstick in the form of a voluntary control system based on spectrography which assures consumers of the purity and hence, the superior physical properties inherent in die castings made of 99.99+% zinc. With such assurance manufacturers can make still greater use of the products of this comparatively young and vigorous industry whose phenomenal growth in recent years has made it the second largest consumer of zinc.

**ST. JOSEPH LEAD COMPANY**
**250 Park Avenue · New York 17, N. Y.**



A spectrograph is basically a picture of a spark. All elements, when "excited" by heat or electrical discharge, emit radiations of known wave lengths. In spectrography, this light is dispersed into its component parts (the spectrum) and recorded on a photographic plate. The wave lengths are always the same regardless of what other elements are present in the substance under investigation, and since these wave lengths are accurately known it is possible to identify each line in the spectrum and thus gain a complete knowledge of the composition of the metal. The density of the spectral line bears a direct relation to the amount of the element present, therefore the spectrograph also provides a basis for quantitative analyses.

**BUNKER HILL 99.99+% ZINC**

# With PRECISION You Get . . .

Fayetteville, N. Y.

Syracuse, N. Y.

Cleveland, O.

Kalamazoo, Mich.

Chicago, Ill.

## CONTINUED AND UNINTERRUPTED SERVICE

To assure you of on-time deliveries of your die castings, Precision has the same standardized equipment and methods in all five modern plants. For example, your dies can be used on the die casting machines in any Precision plant. Thus, in case of emergencies, the production of any plant can be supported or completely supplanted with the end result that you are assured of a constant source of die castings to keep your production lines moving.

This Precision policy also permits production of your die castings at two or more of our plants where high quantities are required and a diverse distribution is desired.

Precision is now in position to provide both national and international facilities through our affiliation with the Wolverhampton Die Casting Company of Wolverhampton, England.

Why not play safe and let Precision keep your production lines going with a continued and uninterrupted supply of superior Precision Die Castings?

*Better* DIE CASTING in ALUMINUM MAGNESIUM AND ZINC

Call a **PRECISION** Engineer, Today!

*Since 1909 the name "PRECISION" has been the symbol of highest quality in the die casting industry.

**PRECISION CASTINGS CO., Inc.**

212 Walnut St., Fayetteville, N. Y.

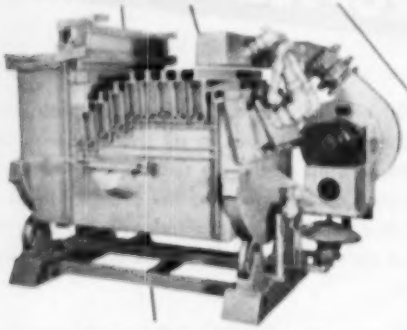
Syracuse, N. Y. · Cleveland, O. · Kalamazoo, Mich. · Chicago, Ill.

British Affiliation — Wolverhampton Die Castings Co., Wolverhampton, England

# 4 WAYS TO *Greater Profits*

## ...FASTER MELTING
## ...BETTER SHOP CONDITIONS!

These four leading Stroman Furnaces are merely a part of the tremendous complete line of furnaces that Stroman makes for use in Foundries, Die Casting, Permanent Mold and Sand Casting Plants. Remember . . . Stroman builds any type or size furnace for any or all size melting problems. Each type furnace does its job exceptionally well, assuring lowest fuel costs, easiest operation, fastest melting and longest life. They are the furnaces you should consider above all others, for they are the acknowledged leaders in the field. Send your melting room problems to Stroman today . . . their engineers, who are qualified experts in melting room procedure and layout, will be only too glad to consult with you and offer suggestions for improvements and savings.



### ECONOMELT FURNACES

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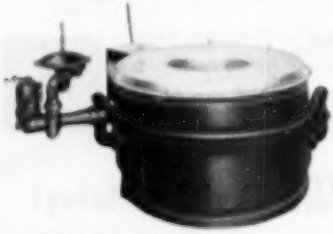

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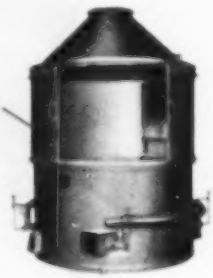

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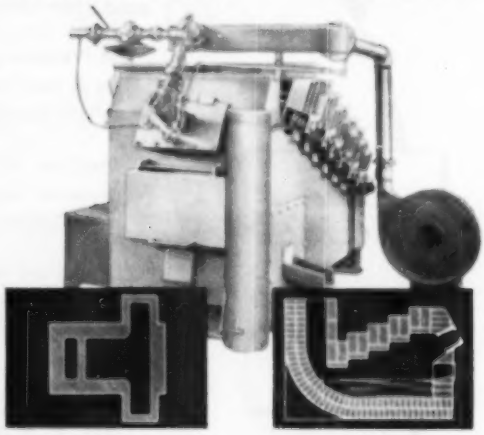

Horizontal view showing 2 dip out bases.

Vertical view showing combustion chamber, metal bath, charging hopper and clean out door.

### STROMAN MODEL MC ALUMINUM REVERBERATORY DIP-OUT FURNACE

It's New! Continuous charging and pouring make it without equal in low fuel and maintenance costs plus quality castings. Two Stromans in one . . . the combination of breakdown and holding furnaces makes this the most economical furnace ever designed for aluminum melting. It can be used for melting, holding, alloying fluxing for either casting or producing ingots. Cold metal does not reach the molten bath. Hot metal is always available for dipping. No iron pots or crucibles to buy. Bath capacities range from 500 to 10,000 lbs. Oil, gas or combination oil-gas fire.

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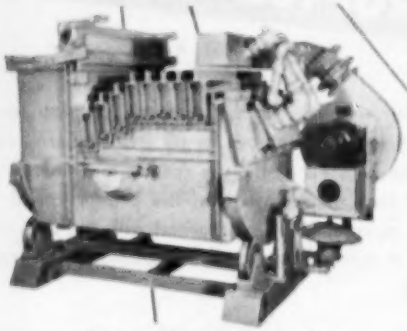

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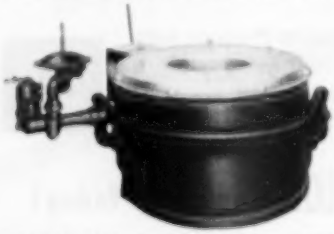

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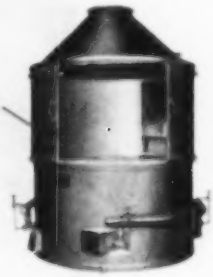

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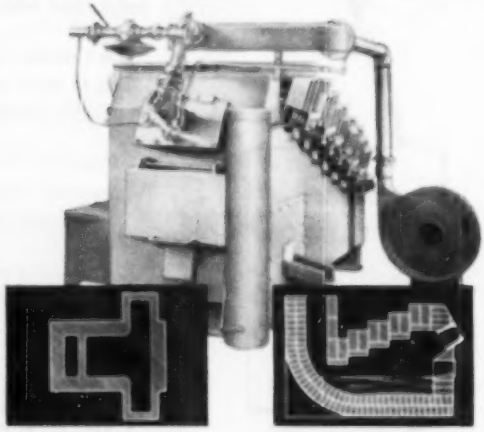

Horizontal view showing 2 dip-out boxes.

Vertical view showing combustion chamber, metal bath, charging hopper and clean out door.

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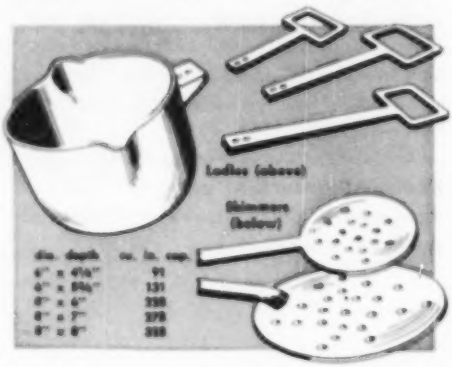


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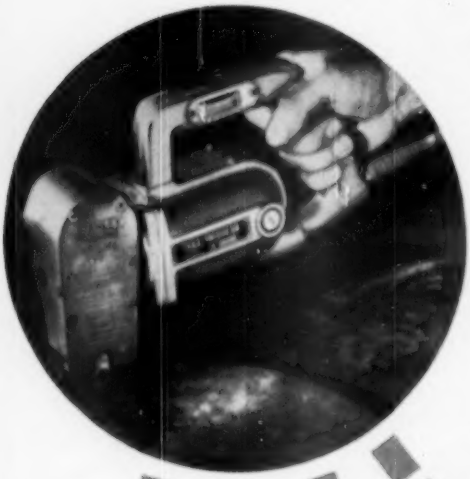
# Cutting Costs on Cutting Tools

**A CASE HISTORY:**



Stanley Unishears cut steel, but Stanley Electric Tools, New Britain, Conn., cut costs.

Prize example is the new Unishear No. 214-A, made with five Hoover die castings instead of the sand castings used in the preceding model.

Stanley engineers report that—due wholly to the advantages of die castings—

*Material costs have dropped 41%*

*Direct labor costs have dropped 19%*

*Machining rejects are fewer because the die castings are uniform in size and shape*

*Styling is better because the die castings provide smooth surfaces and clean detail*

*Direct and related savings are expected not only to absorb the die costs within five years, but to return at least 20% per year on the investment*

Perhaps Hoover die castings—backed by Hoover's 28 years of experience and its complete engineering, design and production service—can reduce the costs or improve the sales appeal of *your* product. It's certainly worth looking into. Just ask a Hoover sales engineer to call on you. There's no obligation.

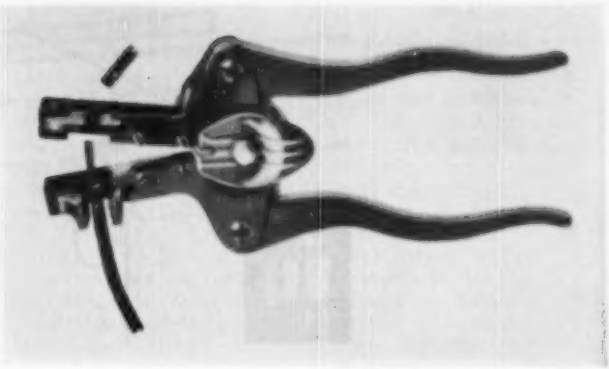
**HOOVER**

*SPECIALISTS IN THE FIELD OF DIE CASTINGS*

**THE HOOVER COMPANY**

Die Casting Division, North Canton, Ohio

Figure 1. Up to 1000 wires per hour can be stripped of insulation with this small hand tool, yet the two die cast "jaw" pieces which take much of the stress give excellent service. These tools, which are especially useful in the electrical, automotive, aircraft and home appliance fields, are subjected to heavy duty and the normal abuse received by hand tools.



# Special Shapes For Small Tools

SMALL special-purpose tools, like the Speedex wire stripper produced by the Wood Specialty Manufacturing Company, frequently have parts with unusual shapes which can be produced more economically by die casting.

Gripped in the hand like a pair of pliers, this tool, Figure 1, goes through a sequence of three motions in response to the tightening of the grip. This removes insulation from the end of a wire cleanly and quickly.

The operating portions of the tool consist of two pairs of jaws, one of which clamps down on the wire while the second set of jaws cuts through the insulation. These two motions are the first ones of the sequence. The third and final motion is the separation of the two sets of jaws, stripping the insulation.

This tool is of especial application in the radio, electrical, automotive and aviation fields where the stripping of wire is a production line operation. Hence, these small implements are used in large enough quantities to validate the use of die cast tooling.

Because they can be used almost as they come from the die, the two complex castings, Figure 2, represent important savings in the production of the wire stripper. These castings form a major portion of each pair of "jaws".

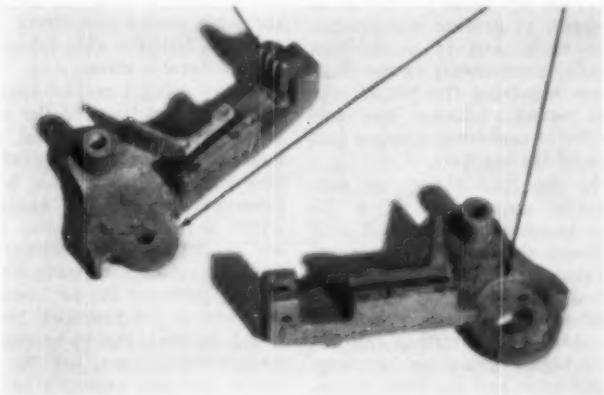
One of the die castings contains the upper jaw which grips the wire in the first motion, and it also has a longitudinal slot in which the lower jaw can move. The other die casting forms the frame in which the two cutting jaws can operate.

The two castings have mating hole and boss which fit snugly, as cast, and which are used for

(Continued on Page 62)

Figure 2a. Reinforcement of the jaws is accomplished by the use of heavier section. Special gripping surface and accurate slot for the lower jaw are obtained as cast.

Figure 2b. Two die castings fit together and pivot on these surfaces, requiring no bushing. The hollow boss on one jaw fits into a cored hole in the other without machining.



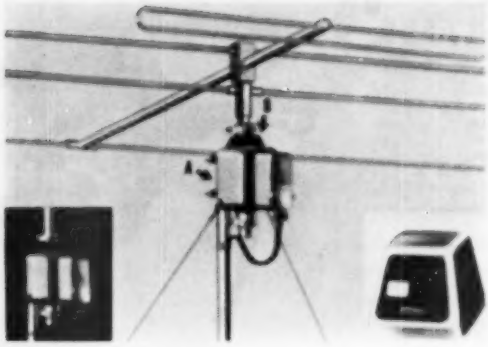


Figure 1. The pressure of the wind against the antenna applies concentrated stress on the rear of the die cast housing where it is clamped to the pole by four thru-bolts, indicated at "A." Further stress is the downward load of the antenna, which is carried directly in the die castings, indicated at "B".

# Protection against Wind and Rain

**In specifying die castings for the housing of this television antenna rotator, Alliance Manufacturing counted on large volume production for rapid tool amortization. The sturdier, better-looking die cast housing has helped them to make sales in a highly competitive market.**

EXPOSED to the weather and subjected to heavy stresses, the rotator unit of the Alliance Tenna-Rotor is housed in a pair of close-fitting zinc die castings.

Not only are the housing halves zinc die castings, but the hollow shaft which supports the mast, and the helical gear through which it is driven, are also produced by this method. Two smaller parts are also die cast.

Alliance Manufacturing Company was first in the field with a unit to rotate the television antenna in order to improve video reception. Recognizing that this would be a large market, and believing that the use of a sturdy die cast housing would help to sell the device, Alliance decided to invest in die casting tools right from the start, even though it would have cut down somewhat on the initial investment to start with stamping dies. The ultimate production-line saving from the use of die cast tools was predicated upon the expectation of large volume.

These estimates proved to be correct: by getting into production early, and by using high quality components rather than those requiring the lowest capital outlay, Alliance has succeeded in capturing a major portion of the market.

In the first place, the substantial appearance of a die cast housing, as compared with a flimsy, thin-edged stamping, is a favorable sales factor; and in the second place, the saving in production time and costs over an extended production run due to integral mounting brackets, cored holes and accurate dimensions more than compensates for higher initial tool costs.

### Housing Resists High Wind Stress

The housing of the rotator not only serves to shield the motor and mechanism from the weather, but it is also subjected to considerable stress.

Four long bolts extend through cored holes in the rear half of the housing and are clamped around the supporting pole with U-bolts. Thus, wind pressure against the antenna which is held in a die cast hollow shaft through the center of the housing, applies heavy stress on the portions of the housing adjacent to the rear bolt holes.

This stress is met by increased section thicknesses, but the inherent physical strength of the

alloy and its satisfactory aging characteristics are also primary design considerations in meeting the stress. (For some mechanical properties of the Zamak 3 alloy in which these parts are cast, see Table 1.)

It has been found to be unnecessary to apply any chemical treatment or coating to the surfaces of the zinc die castings, even though they are exposed to all sorts of atmospheric and temperature variations. Strength of the alloy is not appreciably altered by exposure over a prolonged period, and no failures have been reported from the field, even among rotators exposed to coastal salt atmospheres.

### Most Tolerances Are Not Critical

There are few critical tolerances on the die cast members of the assembly, and it was therefore considered feasible, during initial design stages, to eliminate all machining on the die cast parts. However, practical experience has proved that certain minimum operations are indispensable.

For example, the bearing surfaces between the two housing halves, in which the mast support rotates, cannot be used as cast. The zinc-on-zinc bearing for this purpose was not satisfactory and therefore some stock has been machined from the bearing surfaces to allow space for stainless steel collars.

### Alloy Ductility Used For Easy Assembling

The bearing seats are located from the as-cast surfaces of the bosses on which the gear train bracket is mounted. These bosses represent the closest cast tolerances on these parts, with tolerances on depth and center distances $\pm .005$ and on diameters of $\pm .0015$ .003.

Table 1

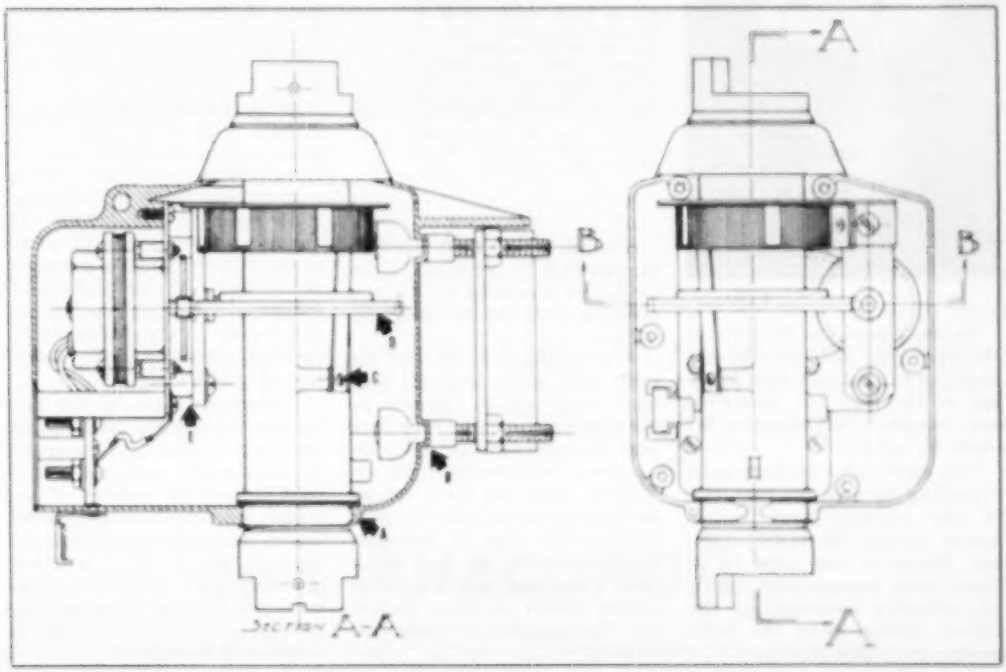
**MECHANICAL PROPERTIES**

Some mechanical properties of Zamak 3 zinc die casting alloy (ASTM XX-III):

| | |
|---|---|
| Charpy impact strength, ft. lb., as cast* | 20 |
| Charpy impact strength, ft. lb. after 8 yrs. indoor aging* | 25 |
| Tensile strength, psi, as cast | 40,300 |
| Tensile strength, psi, after 8 years indoor aging | 34,400 |
| Compression strength, psi | 60,500 |
| Modulus of rupture, psi | 95,000 |
| Shearing strength, psi | 30,900 |

*$\frac{1}{4}$" x $\frac{1}{4}$" test bar.

Figure 2. Simplicity of construction of the Tesna Rotor is revealed by these drawings which show how the mast support is clamped between a pair of housing halves. Indicated are: A) bearing surfaces of the housing halves which are reamed to permit insertion of a stainless steel collar around the rotating member; B) thru-bolts by which the unit is clamped to the pole; C) integral mounting boss on mast support shaft for the potentiometer finger; D) die cast helical gear; and E) accurate bosses for mounting the gear train bracket and motor.



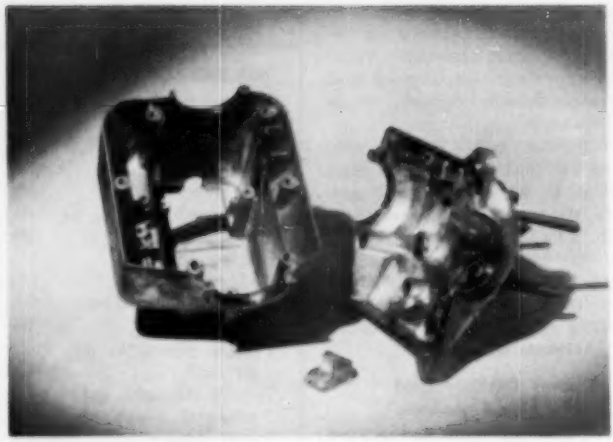


Figure 3, *above*. By slipping four bolts through hollow bosses and crimping over the zinc alloy die cast metal, a permanent and inexpensive assembly is made. Also, all mounting surfaces for gear train bracket and motor are integral, requiring no machining other than the tapping of holes.

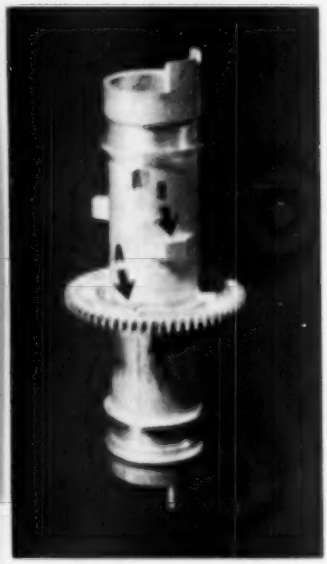


Figure 4, *left*. The rotating hollow shaft in which the antenna mast is held is a die casting, which includes several camming bosses (B). The die cast helical gear (C) is mounted without special fasteners by means of four radial slots which fit over four small lugs on the shaft (A). The lugs are then staked to grip the gear. Unmachined shoulders on the lugs locate the gear accurately.

In two places, the ductility of the zinc alloy die castings has been put to good use. Cold forming of the zinc has permitted ease, accuracy and economy for these fastenings.

The cored holes for four bolts extending through the rear half of the housing have hollow bosses around the inside opening. Heads of the bolts lie in these cored recesses, and a simple crimping operation on the hollow bosses locks the bolts permanently into position.

Another place where this type of assembly is utilized is the method of attaching the die cast helical gear to the die cast mast support.

Four radial slots around the shaft hole in the gear fit over four small splines formed on the mast support. The gear slips over the mast support and butts against a shoulder to locate accurately, and the four splines are then staked to grip the gear rigidly. This type of assembly requires no drilling, tapping or other machining, and eliminates screws, rivets or other fasteners. The operation is rapid and certain.

The gear is an example of cost-saving by die casting. The helical gear would be an expensive piece to produce by any other method. However, the skill of the die caster has made possible the forming of the slight helix, and the Alliance company has no machining whatsoever on this part.

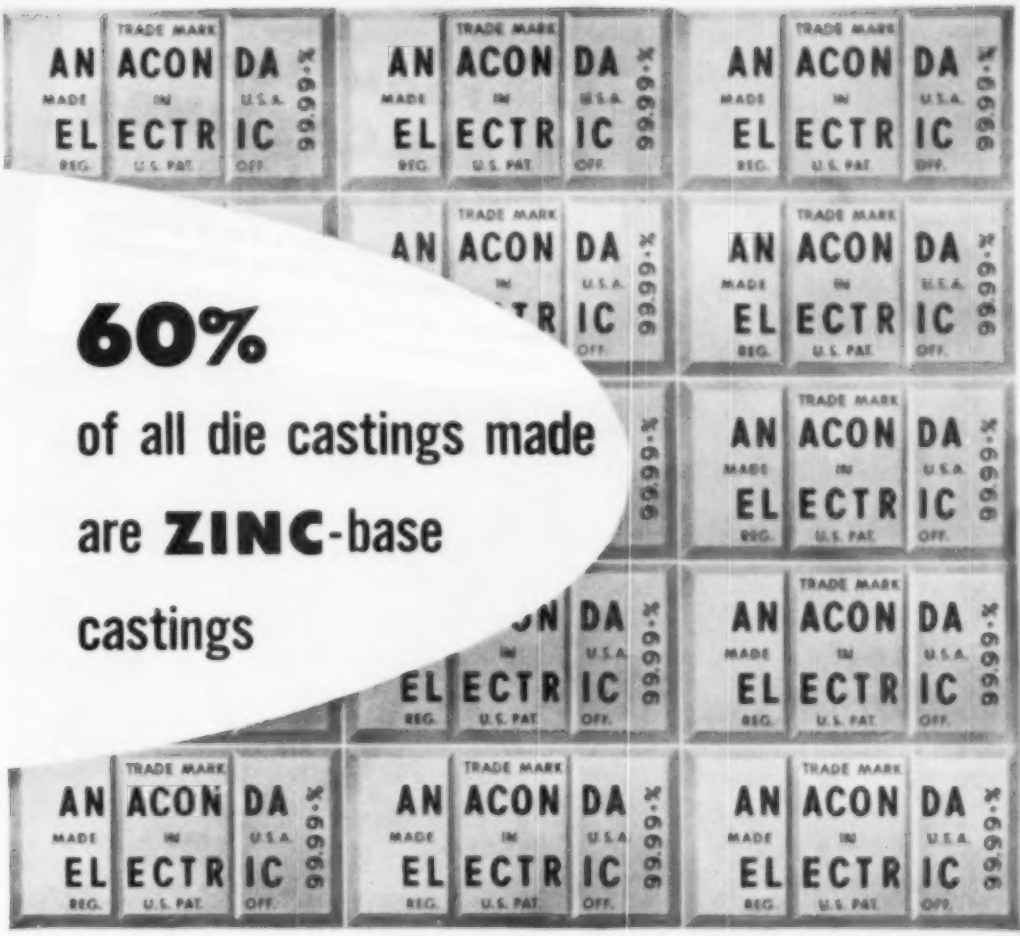
Metal savers cast around the body of the gear reduce the amount of metal consumed without affecting either the tooth strength or gear flatness. The strength of the alloy permits this economy in many places in die castings, eliminating unnecessary wall or section thicknesses.

It should be noted that the designers of the parts allowed the die caster considerable freedom in the matter of draft and internal ribs for proper die filling. This type of consideration for the problems of the die caster has been an important factor in the successful production of these parts.

The Alliance Tenna-Rotor is an antenna rotator designed to rotate the beam antenna in FM, television and other high frequency radio application. It consists of the rotator which is mounted on the antenna mast, and the control box placed adjacent to the receiver.

It is manufactured in two models, with or without directional indicator control case. A three-position selector switch controls the rotator. Throwing it to right or left rotates the hollow shaft clockwise or counterclockwise through a complete arc of 360°. At the position of optimum reception, the switch is released to the center (off) position, permitting exact selection of position.

Difference between the two models is that the Directional Indicator control case shows directions north, east, south and west to indicate position of antenna, whereas standard model has an automatic signal light to indicate limit of travel in either direction. The direction indicator works through a contact finger and potentiometer hooked in series with the motor.




The strength and corrosion resistance of zinc; the smooth, easy-to-paint, easy-to-plate surfaces which are characteristic of zinc-base die castings; the ease and speed with which zinc-base die castings can be produced, have earned for zinc its predominant place in the die casting industry.

Absolutely requisite, however, is extreme purity of the zinc used. Anaconda is a dependable source of dependable Electric* Zinc, 99.99+% pure — always! Anaconda does not make die castings, but supplies ANACONDA Electric Zinc, 99.99+% pure, to the die casting industry. Anaconda Sales Company, 25 Broadway, New York 4, N. Y. Subsidiary of Anaconda Copper Mining Co.

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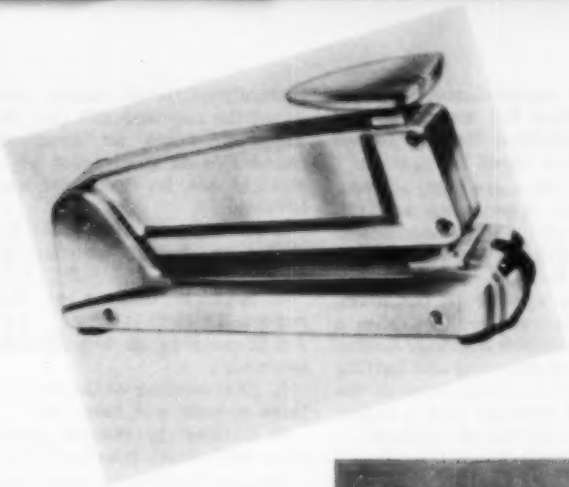


Figure 1. Greater freedom in styling has been permitted because of the use of die casting.

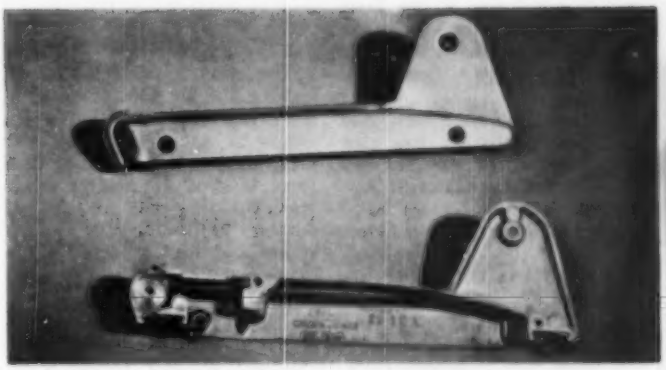


Figure 2. Two halves of the base fit snugly together, requiring only disc sanding of mating faces. Approximately nine ounces have been saved by using aluminum.

# A Staple Design

**Body, base and plunger of this new stapler are die cast in aluminum, giving a more economical and better-looking unit than the conventional fabricated sheet metal staplers.**

STAPLERS have to be built to take a beating—literally.

Wilson Jones Company, manufacturers of record keeping equipment and supplies, make their new "Tatum" stapler from aluminum die castings to obtain a combination of rugged durability and lightweight balance. It is designed for triple action—stapling, pinning and tacking.

When used as a tacker, a friction clutch firmly holds the appliance in an extended position and prevents the joint from collapsing. The mere flip of the anvil wheel changes it from a stapler to a pinner. In all phases of operation, the ejected staples have a five-sided support to insure a forceful and direct thrust of the staple.

Both the body and base are built of mating aluminum die castings, with integral structural elements to mount the working mechanism. The plunger is also a one-piece aluminum die casting.

Conventionally, staplers have been fabricated from separate steel stampings and other parts, laboriously formed, fitted and assembled. By contrast, only four secondary operations are required to turn the five die cast pieces into finished components, ready for assembly.

Integral bosses, slots and mounting surfaces not only save on production line operations, but also are responsible for a sturdier piece of equipment, since there is nothing to work or get out of alignment.

Numerous parts which would have to be formed and assembled from steel sheet stock have been combined, by die casting, into a unitary type of construction. This factor lifts a number of the limitations on shape and appearance, permitting the stylist greater freedom in planning contours and shapes.

A single casting can be designed with whatever curves, recesses, and modulations are desired, whereas a stamping is limited by the number of forming operations and the types of curves which can be stamped or drawn. For this reason, fabricated staplers have lacked the smooth contours consistent with modern office furniture and equipment.

The streamlined design of this product is also conducive to the new lines of home furnishings in dens and libraries. With respect to home use, it has been found practical for fastening frozen food packages, monthly bills, and Junior's homework papers.

Lightness, another desirable feature in a stapler, has also been obtained through the use of aluminum die castings. Approximately nine ounces have been saved by employing aluminum rather than steel. The entire unit is constructed of die castings except for three ounces of steel working parts and the rubber base pads.

In these cost conscious days, the question of tool costs and amortization looms as an important factor in any design program. Wilson Jones engineers have found that die investment and die maintenance costs are lower than for stamping dies and production fixtures for an alternative sheet fabrication.

From the users point of view, attractive appearance and durability of finish are considerations. Since aluminum is not subject to rust, the mechanical finishing applied to the aluminum die castings provides a bright, lustrous and long-lasting surface. A polishing and buffing set-up gives a satin finish on the recessed surfaces and a bright finish on the raised surfaces.

### Cost Slot Closer Than Minimum Tolerance

The specific problems in designing the die cast parts were not great, since all of them were simple to cast. One change was necessary in the design to conform to good die casting practice, but this was anticipated during preliminary design stages and thus incurred at no extra cost.

This change was in the slot in which the removable staple slide is inserted. It was required that this slot be .027 inches wide, which was too narrow for die casting practice. This slot was re-designed, being 3/32 inches wide but zigzagged in its length so that the difference between inwardly directed lands produced the required .027 inch dimension. Since an irregular channel is as easily cast as a straight one, no extra cost was involved.

Secondary operations required by the die castings included:

1. Multiple drilling of the body and base;
2. Broaching on the plunger assembly;
3. Disc sanding on the mating faces of body and base; and
4. Buffing to remove small flash and obtain a satin finish.

Thicker sections of web have been designed at points where higher stress occurs during use and normal abuse of the stapler. The unit has now been in operation for more than a year and continues its smooth, easy operation without a sign of structural failure. The ability to "place metal where it is needed" and eliminate it where it is not needed by die casting irregular wall sections, makes it possible to gain stress-resistance and lightness at the same time.

Outlets for the new product are retail dealers, wholesalers and foreign markets. The stapler is the most recent addition to the Wilson Jones line of office equipment and is available at leading stationery and office supply stores throughout the country.

Figure 3. All internal structural details are "built-in" by virtue of the die casting process which permits unitary construction. All seams, rivet heads and unsightly sheet metal edges are avoided.

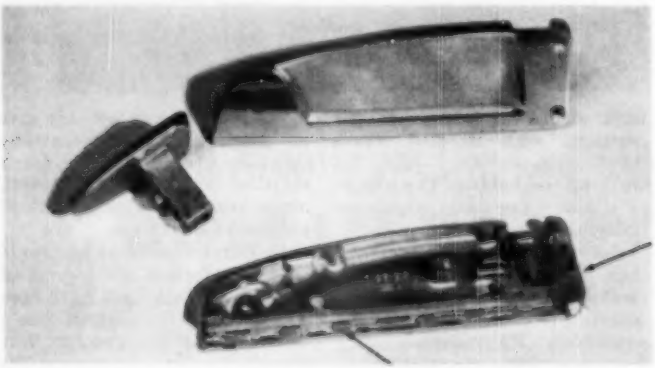


Figure 3a. One of the special advantages of the die casting process is the ability to put metal where it is needed, thus permitting heavier sections for added strength, and thinner sections where there is no stress.

Figure 3b. Original plans called for a slot too narrow to be die cast successfully. The problem has been solved by a zig-zagged slot 3/32" wide so that the space between inwardly directed lands gives the desired slot dimension for the removable staple slide.

# Use Die Castings to Put the Best Foot Forward

SEVERAL types of coin-operated machines to perform personal services have made their appearance in waiting rooms, hotels, subways and other public places. Instead of offering merchandise, these units perform a service, and they are getting a warm reception from the hurrying public who appreciate speedy service during the moments normally wasted waiting for trains, buses, phone calls, etc.

Newest device is a coin-operated automatic shoe shine machine that applies a wax polish and automatically shines a pair of shoes in less than two minutes.

Uneeda Shine Machine Company, New York, has perfected equipment of this type and put it into production after more than two years of development work. The use of standard die cast vending machine parts such as coin acceptors, couplings, pulleys and similar power transmission elements has simplified the production job and saved a great deal of the tooling costs.

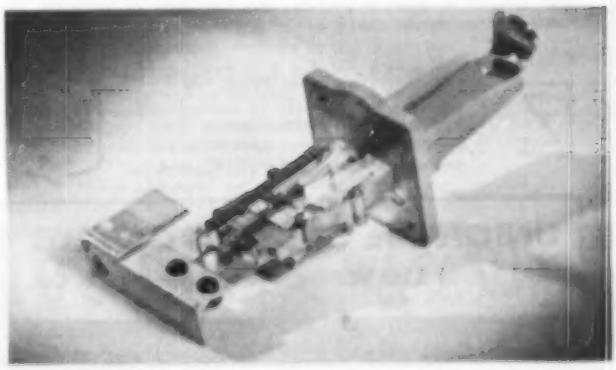
It has also allowed Uneeda designers to concentrate on the major problem—proper application of shoe wax to the shoe.

For example, it has been relatively simple for company engineers to adapt the standard coin acceptor so that it not only starts the motor which operates the buffing wheels, but also winds a small timing mechanism to control the duration of operation.

The machine has been constructed for simplicity of operation, ease of servicing and durability of all parts. The use of zinc die castings in motors, couplings and pulleys by producers of standard coin machine mechanisms help to meet these requirements.

The wax applicator, the most difficult problem to be worked out on this machine, is linked to the motor by die cast pieces which reduce the speed of rotation to 30 rpm. This raises and lowers the elongated cake of wax into contact with a horse hair rotating wheel by which the polishing wax is applied intermittently to the shoes. After waxing, the customer puts his foot under one of the other cotton yarn buffs to shine the shoes.

The Uneeda Shine Machine gets durability and lowered tooling costs by the use of standard coin machine mechanisms built of zinc die castings.



This coin acceptor, built for Uneeda by The Monarch Tool & Mfg. Co., is constructed principally of three complex die castings.

### STEWART-WARNER DIVIDEND

A 25c per share cash dividend on the $5 par value common stock was declared by Stewart-Warner Corporation directors today. The dividend is payable on April 8, 1950, to stock of record at the close of business March 17, 1950. A dividend in the same amount was paid on January 7, 1950.

### TECHNICAL PROGRAM ANNOUNCED FOR COST-CUTTING EXPOSITION

The technical program for the American Society of Tool Engineers' Industrial Cost-Cutting Exposition to be held in the Exposition Buildings, Philadelphia, during the week of April 10-14 has been announced. A total of 21 papers in addition to the Economics Forum have been scheduled.

The Economics Forum will be held in Philadelphia Music Hall on the evening of April 10 with J. S. Hildreth, president of the Chilton Company as chairman and Dr. Edwin G. Nourse as moderator.

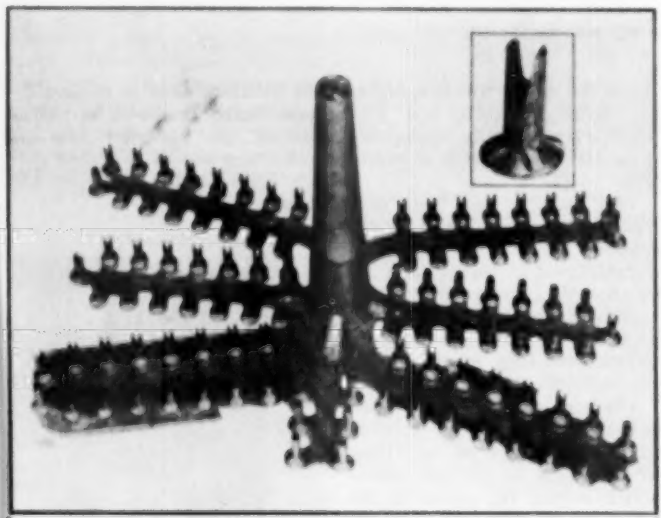
Technical sessions are to be held throughout the week, with attention centered on various phases of cost reduction in tooling for production.

Of particular interest is a paper to be presented Tuesday morning by Charles Franklin, master mechanic, Rochester Products Division, General Motors Corp. His subject will be "Design and Use of Die Casting Dies." Chairman of the session will be J. O. Horne, sales manager, James O. Horne & Co.

Other topics to be covered in sessions are: "Developments in Pressworking of Metals," "Cold Extrusion of Metals," "Automation of Ground and Turned Production Parts," "Machining and Fabrication of High-Temperature Alloys," "Machinability," "Trends in Drilling," "Metamics," "Cold Roll Forming of Metals," "Automation," "Tooling Up for Modern Truck Engine Production," "Use of Element Time Data for Effective Tool Design," "Hard Surfacing of Production Tools and Gages," "Broaching Applications for Cost Reduction," "Automation in Hopper Feeds for Assemblies," "Design Economics," "Investment Casting," and "Effect of Latest American Standards on Spindle Deflection."

### EXHIBIT AT ASTE SHOW

The Jones & Lamson Machine Company, Springfield, Vermont, will exhibit their complete line of optical comparators, automatic opening threading dies and carbide cutting tools at the ASTE Industrial Exhibition to be held in Philadelphia, April, 1950.

**"Rivet-like" Castings of No. 6 Zamak Alloy Outlast and Out-perform Other Metals**

Used extensively in gasoline absorption plants. Dimensions per inset cut shown above. Elements on conical head divide gas passage into four long, narrow jets projected outward and upward.

Steel or brass rivets could not provide these four elements. The weight of zinc is perfect, the hardness of pressure die casting superior for the job.

*(This is a patent of J. A. Campbell Engineering Co., Long Beach, Calif.)*

*Tell us YOUR requirements. Perhaps we can suggest advantageous use of die casting for YOU also.*

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Zinc die castings too small to be racked efficiently can be barrel chrome plated by a new process. For details, see article beginning on page 45.

## ARMOUR INSTITUTE REPORTS ON CURRENT RESEARCH PROJECTS

Accomplishments in a wide variety of scientific fields make up an annual report issued by Armour Research Foundation of Illinois Institute of Technology.

Descriptions of more than 200 research projects undertaken by Foundation scientists and engineers during the 1948-1949 fiscal year appear in the 44-page report. The projects range from rats to rockets, from 70 miles high to bottom of oil wells, and from a noise survey in one city to economic developments for an entire country.

A total of 296 research projects were undertaken by 630 staff members at Armour Research Foundation during the year, according to the report.

### DIE CAST FLEXIBLE COUPLING GIVEN HIGH LOAD CARRYING RATING

Among the many projects mentioned in the 44-page Annual Report of the Armour Research Foundation is an investigation of the load carrying capacity of a standard, die cast zinc alloy flexible coupling.

The project, carried out for the Central Die Casting Company of Chicago, found the catalog ratings of the coupling to be conservative, since it could withstand much higher loads.

The flexible coupling was connected between a standard Chevrolet test engine and an absorption dynamometer. Loads up to 30 hp at 3500 rpm were applied in this work. An engine - dynamometer test such as this is more punishing and severe than a similar test with an electric motor because of inherent vibration and constantly recurring stress reversals.

Sponsored by industry, government agencies, and the Foundation itself, the projects represent an investment of more than $4,000,000. This was an increase of 22 per cent over the previous year.

The Foundation is a non-endowed, not-for-profit scientific research and development organization founded in 1936 to serve industry. Any excess of income over expenses is used to finance fundamental research in the public interest and to pay for the Foundation's continuing public service activities.

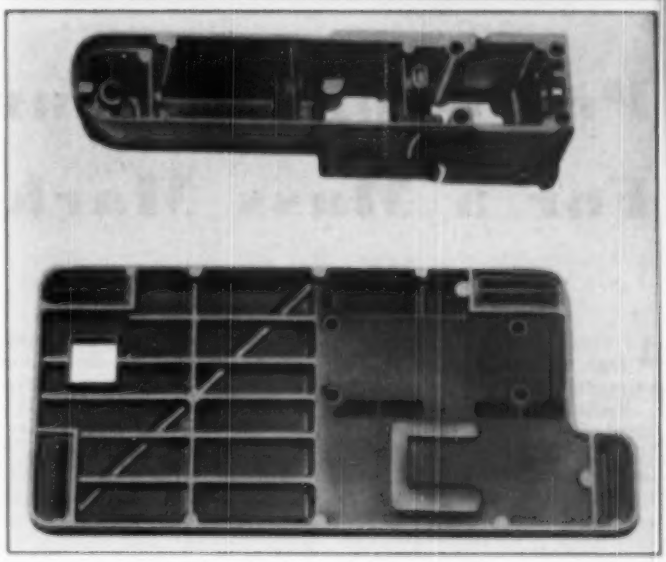
Dr. Haldon A. Leedy, Foundation director, announced a budgeted expansion of 15 percent for the 1949-50 fiscal year. Part of the staff moved its offices to the recently acquired Huber and Huber building on the Illinois Tech campus this week, and other plans for expanded space and facilities are under way, he said.

## APPOINTMENTS ANNOUNCED BY CRUCIBLE STEEL

Appointments of David Kirk Stuart as manager of the Pittsburgh Branch of the Crucible Steel Company of America and Richard J. Rand as assistant branch manager have been announced by W. H. Wiewel, vice president in charge of sales.

Mr. Stuart will fill the position left open by the promotion of John S. Billingsley to Central Sales Manager on August 17, 1949.


MORE ACCURATE DIE CASTINGS SEWING MACHINE PARTS



**Top die casting is the Lower Arm; bottom casting is the Base**

An excellent example of the elimination of a high amount of machining. Bushings are cast in locations specified by customer. Both of these good sized castings are aluminum alloy. Both avoided a lot of "headaches" in final assembly.

Tell us about your requirements. We'd like to get acquainted with you. *INQUIRIES INVITED.*

ACCURATE DIE CASTING COMPANY

3089 E. 80TH ST. CLEVELAND 4, OHIO

Figure 1a, *left*. The Draftrite meter is a compact instrument, fits in the pocket, can be dropped on the floor without being damaged, gives accurate draft readings. The manner in which this instrument is used can be seen in Figure 1b, *right*.

# Precision Instruments For a Mass Market

IS there a mass market for high precision scientific instruments?

Bacharach Industrial Instrument Company of Pittsburgh conducted a comprehensive market research analysis and came up with the conclusion that instruments which will make certain types of measurements and determinations can be sold in the consumer and domestic service fields.

The concept of using precise measuring instruments in the home for convenience and utility depends, of course, upon the manufacturer's ability to produce devices which have the requisite degree of accuracy and yet can be sold at a price consistent with normal consumer buying habits.

Thus, the whole idea introduced by Bacharach—of making scientific instruments available to large numbers of people at low cost—has been achievable only by utilizing the die casting process which is characterized by uniformity, accuracy and low cost when used for large volume output.

This company manufactures several special instruments for measuring the efficiency of home heating and ventilating systems. Two of the Bacharach instruments are presented here: the Draftrite pocket draft gauge, Figure 1, built from a pair of zinc alloy die castings, and the FloRite air velocity meter, housed in aluminum alloy die castings.

### Withstands Rough Handling

Company engineers started from the assumption that any popular instrument must be compact, easy to read and able to withstand whatever rough handling or abuse it might receive.

Previous types of draft gauges, for example, had simply been small scale adaptations of laboratory equipment, requiring special handling and adjustment, constructed of fragile or easily damaged materials, and not suited to be carried around as working equipment.

The same degree of accuracy has been built into the Draftrite gauge, but in addition, several other important features have been added. It is small enough to fit readily into the pocket, it is strong enough to be dropped on the floor without damage, and so simple in construction and operation that it can be used by completely untrained people.

The die cast housing halves contribute directly to the above features and, in fact, this combination of durability, accuracy and low cost could not have been

accomplished by any other fabricating method.

Consider the two castings in Figure 2. These are the housing and cover for the Draftrite gauge. The means for locating and assembling most of the internal parts are incorporated as integral parts of the housing, thus saving a great deal of tedious fitting and fastening operations.

Function of the gauge depends upon the pressure of the draft gases upon a small vane, with an opposing force supplied by gravity. The vane is mounted in a pivot assembly which, in turn, controls the motion of an indicator on a scale calibrated in hundredths inches of water draft.

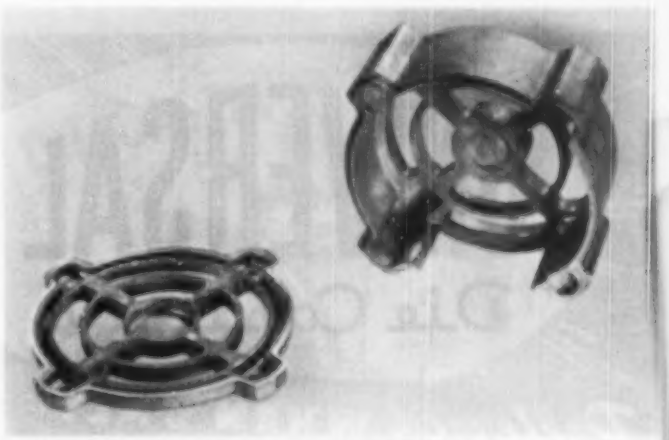
The entire pivot assembly is fastened into the die cast housing by means of two small bosses which extend through holes in the pivot assembly mounting plate and are riveted over.

After the pivot assembly is mounted, the vane is soldered to the lower end of the pointer using a special fixture to locate it accurately in relationship to the curved air channel in the die casting. Variations in the channel do not exceed .001 due to the use of a plated die plug. Walls of the arc-shaped channel are .050 thick.

A pair of large bosses are provided for limits to the motion of the pointer. These bosses are cast oversize, so that they will completely fill, and then they are hollow milled to diameter. A pair of "socks" are slipped over the bosses to prevent the metal indicator arm from adhering to them.

A special boss with a central recess has been provided to hold a calibrator disc which compensates for differences in the weight of solder, air leakage and other variables. The disc fits

Figure 1. The smooth as cast surfaces of these two aluminum alloy die castings give easy finishing and attractive appearance to the FloRite air velocity meter. Notice two recesses into which magnets are inserted to dampen oscillation of the scale.



## MAKING THE MOST OF CAST BOSSES

Figure 2a. The window of the Draftrite is held in place by six tiny bosses which are cold headed as rivets.

Figure 2b. Seven slender bosses provide all over level support for the calibrated scale.

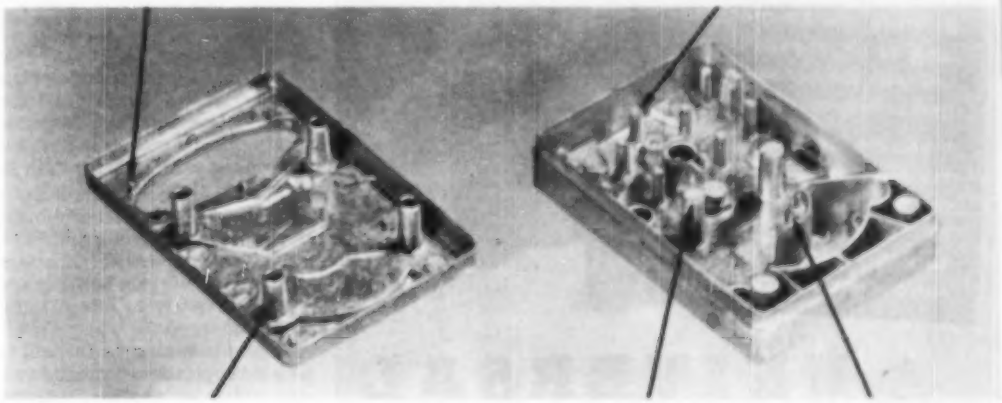


Figure 2c. Four hollow bosses with thru-holes offer a means of assembling the die cast housing.

Figure 2d. To limit motion of the swinging pointer, two special bosses are formed. Because of a slight tendency for the pointer to adhere to the die cast alloy, these bosses are hollow milled and covered with fibre "socks."

Figure 2e. The entire pivot assembly is attached by means of these two small bosses which are riveted over.

into the recess, followed by a fibre washer and then a metal washer, and the edges of the recess are swaged over to retain the assembly.

Seven small bosses have been provided for the level support of the calibrated scale.

In the cover half a series of small bosses have been provided around the window apertures for assembling the window without separate fasteners.

The only machining consists of drilling a pivot hole, tapping four cored bosses for assembling the cover to the housing, and milling the top edge of the housing for flatness. No seal is required around the edge due to the close fit of the castings and the low pressure involved.

Also, the three slender pieces which go into the pointer are assembled by die casting. The pointer, the knee and the pivot, which is a small sharpened piece of steel, are permanently fastened together this way.

The casing is finished with a wrinkle paint, and metal leaf is hot rolled onto the painted surface for the product name and several words on the back.

### Air Velocity Meter

The two halves of the housing for the Bacharach FloRite air velocity meter are die cast with a section designed to provide minimum interference with the flow of air.

This instrument is designed specifically for field use on heating, cooling, ventilating and general industrial application. It gives instant indications in feet per minute showing accurate velocity readings on a scale eight inches long.

Figure 4. Light weight is an advantage for aluminum die castings in the FloRite air velocity meter.

Air impinging upon a vane which rides on jewel bearings, gives the reading, and a special locking device makes it possible to stop the reading and retain it.

A built-in magnetic damper consisting of two Alnico magnets prevents oscillation and makes reading easier. Recesses cored in the die cast housing are shaped properly to retain these magnets.

Only machining is to drill a hole through the center and two side holes for the zero adjusting mechanism. The two magnets are cemented into position. The outside is attractively finished with a wrinkle paint.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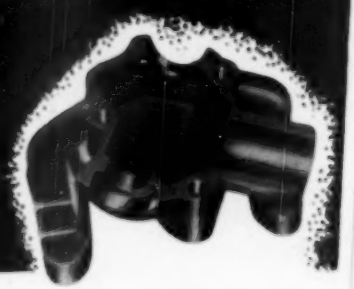
*Preferred* WHEN ONLY
THE BEST IS GOOD ENOUGH

There must be a reason why so many highly discriminating manufacturers entrust *all* of their work to us. The reason is they *know* from experience that the finished job will meet every specification as to appearance, strength, accuracy and function. Furthermore, the price on either long or short runs is in line with their production and selling costs.

If you are located west of the Mississippi River we are in an excellent position to take care of your die casting requirements. Quotations made promptly.



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## JAMES DOUGLAS MEDAL AWARDED TO ALCOA RESEARCH DIRECTOR

Dr. Francis C. Frary, director of research, Aluminum Company of America, was awarded the James Douglas Metallurgical Medal for 1950 by the American Institute of Mining and Metallurgical Engineers at their 79th annual banquet in Hotel Statler, New York City in February.

The award was presented "for distinguished achievement in science and contribution to society by broadening the field of knowledge in all phases of the aluminum industry and for his notable success in directing a vast research project in this industry." The James Douglas Medal has been awarded only four times in the past ten years.

Dr. Francis C. Frary

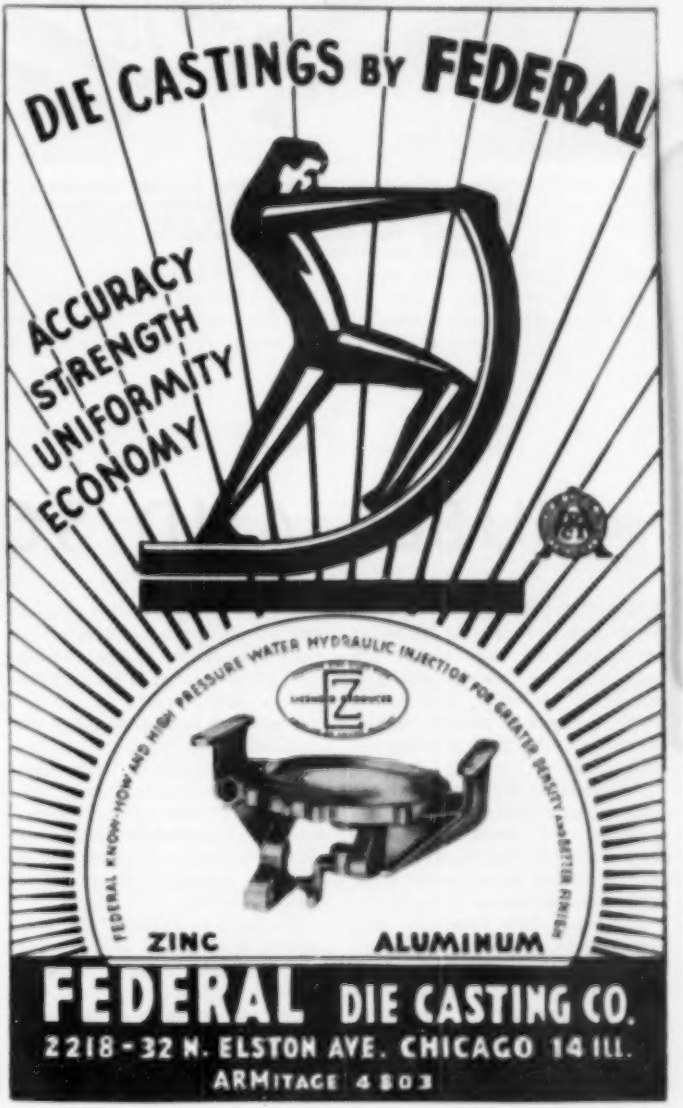
Among the many achievements of the medalist, two of the most outstanding include the production for the first time of very pure aluminum (99.99%) by electrolytic refining, and the production of pure alumina by electro-thermal processes. He holds some thirty United States patents and is the author and co-author of numerous books and papers in the fields of metallurgical and chemical research.

This high honor of the AIME, oldest metallurgical society in America, adds to an impressive list of medals that Dr. Frary has received. He has previously been awarded the Gold Medal of the American Society for Metals, the Perkin Medal of the Society of Chemical Industry, the Acheson Gold Medal and Prize of The Electro-chemical Society, and the Pittsburgh Award of the American Chemical Society, Pittsburgh Section.

Born in Minneapolis, Dr. Frary is an alumnus of the University of Minnesota, Class of '05, where he also received the Master of Science degree in 1906. After a period of study at the University of Berlin, he returned to join the teaching staff of his alma mater and to continue research work leading to the doctor's degree.

In 1915, Dr. Frary joined the staff of the Oldbury Electro-chemical Company where he developed a process for the production of phosgene.

In December 1918, Dr. Frary became director of research of Alcoa. Starting with a small group of men whom he had selected for his staff, Dr. Frary guided the aluminum research laboratories to the present time.

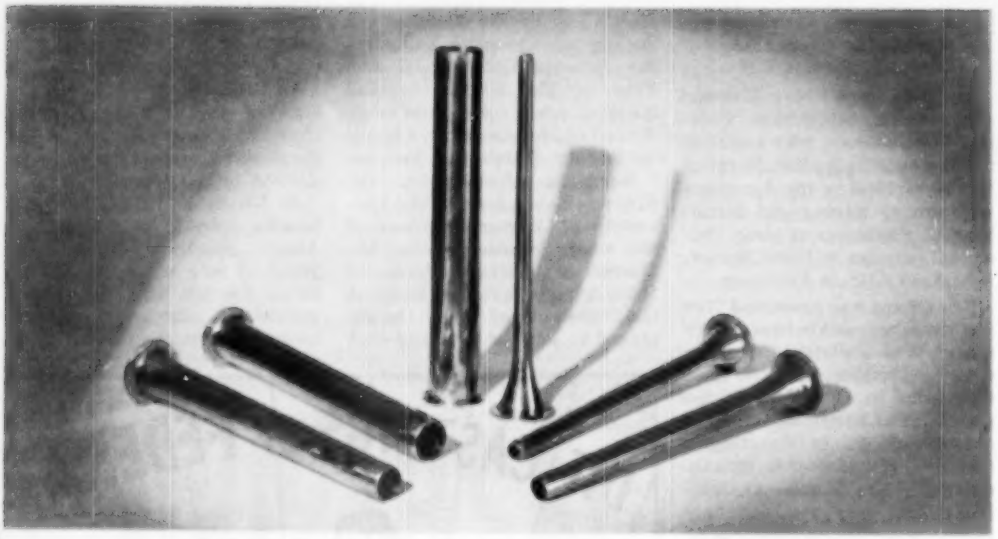


Figure 1. Flanged tubes for the extrusion of sausage into casings are die cast in six sizes, 10½" long with diameters as small as 5/16". Smooth inside surfaces as cast aid in the passage of the meat and ice mixture; smooth outside surfaces prevent snagging or tearing of the delicate meat casings. These tubes are 2" longer than any competitive type of fabrication, and have superior service characteristics.

Figure 2. The die cast stuffer tube clamped to the front end of this sausage stuffing machine.

# TUBES AND SCOOPS

FLANGED tubes, 10½ inches long and ranging in diameter from 5/16 to 1¼ inches, are used with the sausage stuffing machines built by the Salem Tool Company, Salem, Ohio, manufacturers of butchers' equipment.

At one time, tubes of this type were either rolled from sheet tin or machined from sand cast aluminum. During the war, some of the larger sizes were spun from light gauge aluminum.

However, this company has been able to supply sausage stuffer tubes, Figure 1, which serve their purpose better, involve no difficult production problems and are reasonably priced—because they are die cast in aluminum.

Also in the Salem line of tools and equipment is a series of die cast aluminum scoops which, for lightness, durability and finish are outstanding.

The sausage stuffer tubes are clamped to the front end of the Wagner Sausage Stuffer, Figure 2, and serve as a sort of "extrusion die" through which the meat and chopped ice are forced. Stuffer tubes are produced in six sizes and are quickly interchangeable.

Pressure to extrude the sausage is exerted by means of a hand-operated crank working through a rack and pinion. Obviously, the amount of pressure required to force the sausage out through the narrow passageway in the 10½-inch tube places considerable stress on the thin-walled tube. For this reason, all aluminum die castings are heat treated to remove internal stresses.

Another important consideration in the design of the stuffer tubes is surface finish. Smoothness is required on both the inside and outside surfaces: inside to reduce friction on the sausage mixture, and outside to avoid snagging or tearing the delicate sausage casing which is slipped over the tube.

With die cast tubes, smooth surfaces present no problem. Inside surfaces are cored with a degree of smoothness which could not be equalled by ordinary production machining of a sand cast tube.

The production of sand cast stuffer tubes called for slow and extensive machining of all surfaces. The resulting surfaces were far less satisfactory than die cast surfaces as cast. Also, there was considerable difficulty in preventing the drills and reamers from leading out of concentricity.

Now, the inside surfaces of the die cast tubes can be used as cast and the outside is polished with abrasive belts in a very rapid operation. The tubes are held in special spinners and are polished first with a 120-grit abrasive belt and then with a 180 belt.

The use of die castings has also made possible a longer tube. This is desirable, inasmuch as it permits the use of longer sausage casings and speeds up the stuffing of meat. Die cast tubes are two inches longer than any other make of tube.

The die caster has been able to core a through hole 10½ inches long and with a smallest diameter of 5/16 of an inch, even though this is contrary to recommended design practice. It illustrates the point that although certain tolerances and design limitations are set up for the guidance of designers, these may sometimes be disregarded under certain circumstances.

### Long Core Violates Standard Design Practice

Thus, the simple shape of these castings permits the use of a slender core of greater length than might be advisable in a more complex casting. It is sometimes also possible to exceed recommended practice in the matter of section design, size limitations, draft tolerances, etc., but these should be attempted only upon consultation with the die caster who is to produce the castings. He will be able to determine whether or not a particular part is castable.

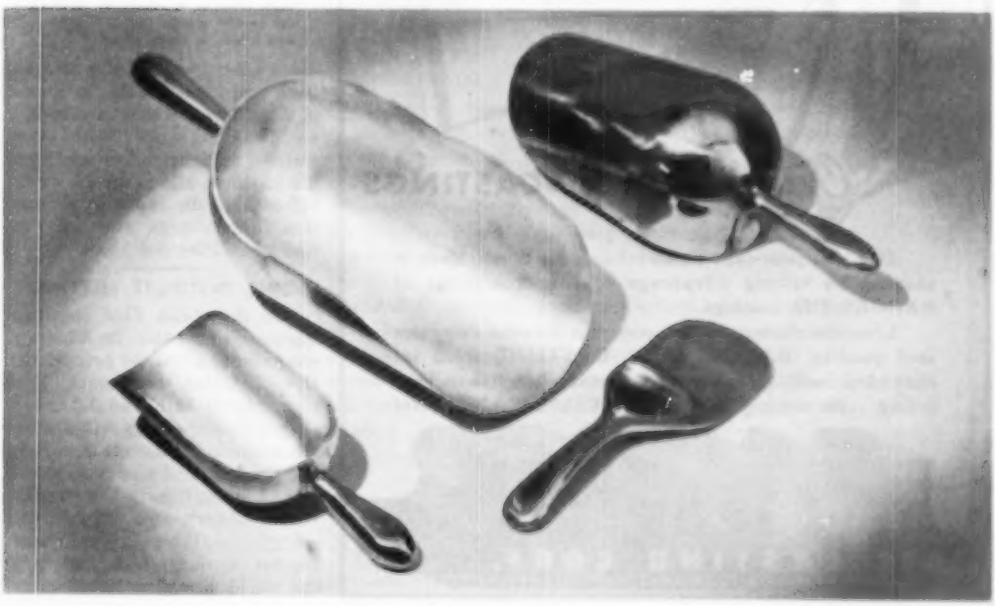
From a cost standpoint, these die cast stuffer tubes have permitted Salem Tool Company to hold the price line. No increase in price has been necessary since the tubes were first introduced. Original tool costs have long since been amortized, and the superior production features of the die castings have allowed these tubes to hold a good competitive position.

One other consideration of importance to the butcher who buys sausage stuffing equipment is freedom from corrosive tendencies. The aluminum alloy is acid resisting and easy to clean. The wide acceptance which aluminum has gained for use in contact with food is well illustrated by the millions of pots, pans and other kitchen utensils now being manufactured from aluminum.

The line of scoops included in the Salem line, Figure 3, consists of four different sizes, plus a lard paddle. Dimensions of the scoops range from 8½ by 2¾ inches to 14⅝ by 4¼ inches.

High tensile strength coupled with light weight are among the advantages of the aluminum die cast scoops and paddles. Size is

*Figure 3. Lightness and corrosion resistance of die cast aluminum alloy are features of these scoops and lard paddles. Finishing with abrasive belts and cotton buffs gives an inexpensive yet attractive appearance to these difficult shapes.*



uniform and finish is smooth and bright.

Finishing the complex shapes of these scoops and paddles is more difficult than in the case of the sausage tubes. Nevertheless, a successful job is being done within the cost limitations required.

The large scoops require belt sanding with 40 grit to remove the flash and sprue marks, followed by 120 grit, 180 grit and then a buffing with an Airflow buff and Tripoli. For the smaller scoops, a sequence consisting of 120 grit and 240 grit belts is sufficient. All finishing is being done by the L. D. Cochran Co., Washingtonville, Ohio.

The lard paddles present a shape which is easier to polish, in that its curves conform readily to a belt or buff. However, some experimental work has been done with tumbling for these paddles, as well as the smallest size scoops.

The paddles have been given a highly satisfactory finish by polishing with 180 grit belt and then ball burnishing them in a tumbling barrel for 15 minutes. Longer tumbling would tend to chip the thin edges of the paddles. The small scoops have been tried successfully in a cycle consisting of 2-2½ hours tumbling with Honite chips and grit, followed by 15 minute ball burnishing.

While the die castings used by Salem Tool Company are not high production items, in the usual sense of the word, their functional design is so effective that the design is likely to remain unchanged over an extended number of years. This

Figure 4. Experimentally, tumbling has been tried as a means of finishing the smaller scoops and lard paddles, with results as shown above.

more than justifies the original high tool investments. In a case of this type, where machining and finishing costs by any other method of fabrication are high, die castings allows rapid write-off of high die costs by production line savings, even on limited quantities per year.

## ZINC INSTITUTE MEETING

The American Zinc Institute has announced that its 32nd annual meeting will be held at the Hotel Statler, St. Louis, Missouri, April 11th and 12th.

Qualified speakers will discuss the outlook for metals generally and the trend of zinc production and consumption in the current year. Government officials will contribute their views with respect to mining at home and the world zinc situation.

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# FINISHING DIE CASTINGS

## A SECTION DEVOTED TO THE FINISHING PROCESSES

MACHINING—Most die castings require some machining operations. In this section will be found information to aid in planning and selecting the proper method and equipment for these operations.

ASSEMBLING—Die castings are generally assembled components. This section includes information on fastenings and methods for mass production assembly operations.

SURFACE FINISHING—Most die castings receive some type of surface finish such as plating, organic coating, anodic coating or chemical coating. This section contains information on the methods, processes and equipment used for the various surface finishing treatments on the die casting alloys.

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The Unichrome Dip Process is also used to chromate-treat unplated castings — for corrosion resistance or to prepare the surface for painting. And with profit! Take, for example, the case of a well known company producing automotive die castings. When they switched to Unichrome Dip Finish primarily for its corrosion resistance, they discovered they were also getting a tidy saving of over 50% of the cost of former materials!

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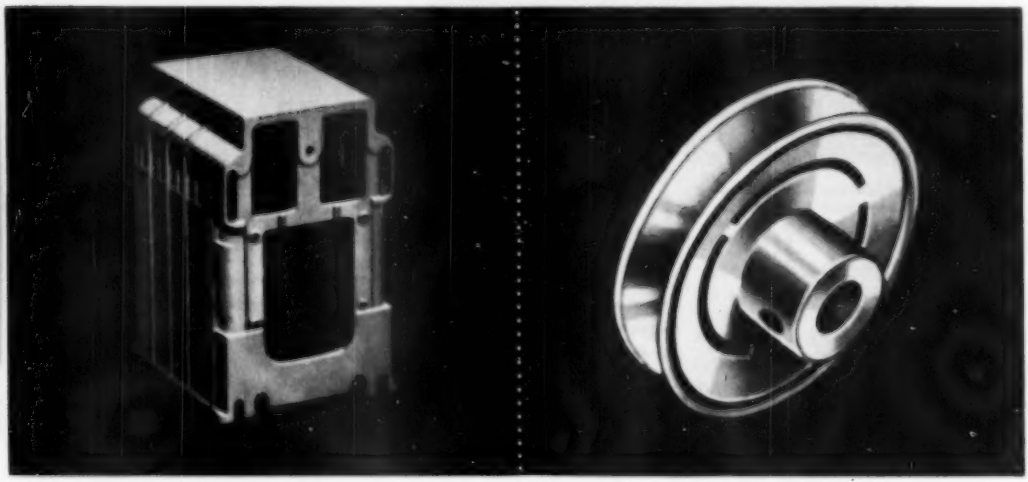

**PROTECTION AGAINST CORROSION!** Zinc base die casting is ready to give long service without developing white corrosion after being put through the economical Unichrome Dip Process. Such a protected casting can be finished with organic coatings without priming.

**CHROMIUM-LIKE LUSTER WITH ZINC PLATE!** This die cast wheel illustrates the bright, corrosion-resisting, *durable* finish you can achieve with ordinary zinc plate. You have to actually *see* its "color" to appreciate its strong sales appeal.

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# PRODUCTION CLINIC for finishing die castings

*A monthly digest of current technical progress selected and prepared by the editorial staff of* DIE CASTINGS. *This section is devoted to finishing processes for all types of die castings, and is written specifically for the benefit of the production man.*

## MODERN CONTROL METHODS FOR BRIGHT NICKEL BATHS PAY IN UNINTERRUPTED PRODUCTION

PRESENT DAY bright nickel plating processes play an important part in finishing operations for zinc base die castings, as well as brass, aluminum and magnesium alloys. Good appearance is important in most applications, and a non-tarnishing coating of chromium is usually applied over the nickel plate. Thus, nickel plating baths, are an intergal part of manufacturing processes using die castings; as such they should be regarded as an intricate piece of production equipment which requires constant attention, just as does any piece of machinery.

It is important that the production man in the die casting plating department always bear in mind that oversight or neglect of any phase of maintenance or control of the nickel plating process can lead only to defective work, lost time, and high production costs.

Although the maximum objective is rarely attained in actual practice, it is nevertheless desirable that plating solutions be maintained at a constant degree of purity and concentration. Many published reports indicate that the present trend in electroplating is toward thicker deposits[1].

Exposure tests and reports on service failure of plated parts both emphasize that durability of the plated finish depends to a large degree on the thickness of the plate. The plater is called upon to produce these with a minimum increase in cost. Study of more efficient methods for operation and utilization to the fullest extent of all the advantages of modern bright nickel plating processes will go a long ways toward holding the cost of quality plated finishes for die castings to a minimum.

The plater who wishes to understand modern nickel plating must first familiarize himself thoroughly with the Watts bath, and the effects of all the controllable variables upon the properties of the deposits made from this type of electrolyte. The fundamentals of nickel plating are based upon the effects of such variables as temperature, nickel concentration, current density, pH and agitation upon deposits from the Watts bath.

In its original formulation this bath opened the way to the use of rapid plating at temperatures above atmospheric. This improvement was in a large part due to bath composition and operating conditions favoring a rich and constantly replenished cathode film and high anode efficiency. As originally designed, the Watts bath[2] contained 240 g./L. (32 oz./gal.) $NiSO_4.7H_2O$; 20 g./L. (2.7 oz./gal.) $NiCl_2.6H_2O$, and 20 g./L. (2.7 oz./gal.) $H_3BO_3$.

In its present day form the concentration of nickel sulfate may be slightly higher, and that of the chloride and boric acid are approximately doubled[3]. Bright nickel solutions are basically Watts type baths to which have been added brighteners.

### Equipment for Bright Nickel Plating

Proper maintenance and control of bright nickel baths begins with the installation of the tank and its auxiliary equipment. Thoroughly tested tank linings should be used.

Figure 1 shows a Korosteel lined nickel plating tank for installation in a full or semi-automatic machine. Internal heating elements are commonly employed; heating of the solution by an external heat exchanger is much to be preferred in many installments. A tube type external heat exchanger constructed of impervious graphite that has found successful use in heating bright nickel solutions is shown in Figure 2.

It is generally regarded as poor practice to use lead heating coils in bright nickel baths because of the possibility of metallic contamination.

Figure 1. Korosteel lined nickel plating tank for installation in a full or semi-automatic machine. The proper choice of tank linings and heating material is important in bright nickel operations. Courtesy Hoil Process Equipment Corp.

Since insulation defects may be a direct cause of poor adhesion or poor metal distribution, tanks for bright nickel plating should be mounted on positive insulating substances, such as ceramic materials; all piping connections for water, steam, or air exhaust should be equipped with permanent insulating joints in order to avoid electrical grounds and short circuits. A system of ground lights has been described[4] which provides a useful system of control against this type of trouble.

The production man should take care of keep all anode and cathode bars, racks and contact points reason-

ably free from encrusted salts in order that good electrical contact be maintained and contamination of the bath with copper be avoided.

Double plate, a term used to describe the peeling of a layer of nickel plate from an underlying layer of nickel, may be troublesome in the production department if due precautions are not taken to prevent the interruption or fluctuation in the current during plating.

Fluctuations or breaks in current flow may be measured by means of a properly placed tong ammeter or more simply, though only qualitatively, by attaching one lead of an ordinary flashlight bulb to the work carrier and the other by means of a trailing wire or rod, to the solution[1]. Variation in the brightness of the filament as the carrier travels through the plating bath indicates a variation in current flow through the plating rack. In case of current interruption, the light goes out.

Either method may be used without disturbing the normal flow of the work being plated. As a general rule chromium plating, which follows the bright nickel cycle, will cause double plate to become apparent. However, there have been cases where plate failure due to this condition develops after the part has been in service.

## Effect of Contaminants

In modern nickel baths, the presence of minute amounts of metallic contaminants such as iron, copper, zinc, or lead have a profound effect on the appearance, corrosion resistance, and physical characteristic, such as buffability, of the deposit. In plants processing copper or brass, or zinc base die castings, the principal contaminants are likely to be copper and zinc; lead and iron are other likely contaminants.

Copper in excessive amounts results in dark colored, deposits that are hard to buff. It reduces the quality of bright nickel deposits, particularly in the low current density areas. It has been reported[2] that copper may be the cause of nickel pitting in a low-pH Watts bath; it has also been found[3] to affect corrosion resistance of nickel deposits.

Zinc contamination has been reported to have much the same detrimental effects as copper. One report[1] states that excess zinc will cause cracking and poor resistance to corrosion; studies conducted by Haring[4] bring out the fact that both copper and zinc contaminants exert a deleterious effect on throwing power, particularly in the low current density areas.

Lead contamination may give peeled and brittle deposits. Small quantities of iron may greatly affect the buffability, corrosion resistance, and brittleness of nickel deposits. There are many factors which determine the amount of metallic impurities that can be tolerated in a nickel bath.

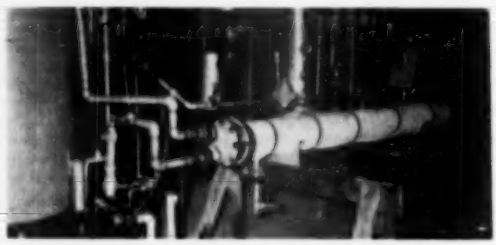

Figure 2. Impervious graphite tube type external heat exchanger for heating bright nickel solutions. Courtesy Hall Process Equipment Corp.

## Methods of Purification

Most platers are familiar with the technique of precipitation to remove most metallic contaminants. When nickel carbonate or freshly prepared nickel hydroxide is added to nickel baths iron is precipitated at a pH of about 5.5; zinc is also precipitated as the hydrate at this pH. If lime (hydrated) is used to raise the pH of the nickel bath, care must be taken not to exceed a pH of 6.5, in which case nickel hydrate may be precipitated and lost in the filter operation. If copper is present in the nickel bath in considerable quantities it may be removed by galvanic displacement on iron or nickel powder, following which the bath must be treated to remove the iron by raising the pH and filtering.

An important detrimental aspect is that the bath must be completely out of operation for an appreciable period of time. Modern practice utilizes low current density electrolysis[5] for the removal of metallic impurities; complete procedures for operation of such a purification scheme on a continuous basis without interruption of production have been laid out[10]. By the proper choice of current density and cathode shape, iron, zinc, copper and lead may all be removed during the same period of electrolysis. The operating pH and the operating temperature of the nickel solution are not changed in practice.

In the electrolysis method of purification, a cathode is used which provides the proper current density ranges for the combination of metallic impurities present. Copper and lead are known to plate out very satisfactorily at about 3—4 amp./sq. ft. while zinc and iron deposit at 6—7 amp./sq. ft. Thus, by using a cathode with symmetrical variations in recesses and high points and an overall current density of 5 amp./sq. ft. the proper current density requirements for all four metals can be satisfied.

In practice, an ordinary corrugated black iron sheet is the most commonly used type of cathode. With an overall current density of 5 amp./sq. ft., all four metals co-deposit with the nickel, simultaneously, copper and lead in the recessed areas and zinc and iron on the high points.

## Continuous Purification Systems

Numerous designs for continuous purification tanks have been developed and used with existing equipment. The purification set-up in Figure 3 has been recommended[10] for use with existing still plating tanks, semi-automatic, or full automatic installations. This design does not require openings in the plating tank proper. A separate pump or the filter may be used as a means to provide circulation. A valve is placed between the pump and the purification tank to prevent back-flow of solution during shut-down. The solution enters the purification tank at the bottom in one end and passes upwards and across the tank to the large outlet through which it is returned to the plating tank by gravity.

Studies have shown that if the purification tank is designed to provide 0.05 ampere-hours per gallon of solution per hour of operation, the worst cases of metallic contamination can be kept under control. On this basis a 1000-gallon bright nickel solution would require 50 amperes (1000×0.05) flowing in the purification tank.

Since, as brought out above, a current density of 5 amp./sq. ft. should be used, the tank should contain 10 sq. ft. of properly shaped cathodes. One cathode having 10 sq. ft. of area may be used, or more than one cathode, so long as the total area equals 10 sq. ft. The choice of cathode size influences the dimensions of the purification tank, but the tank should always be narrow in one or two dimensions to increase the rate of solution flow through it.

Tests under production conditions have shown that if the rate of flow through the purification tank is from one-third to one-half of the total plating solution volume per hour, the system will keep the plating bath free from harmful concentrations of metal-

ic contaminants. Thus, costly shut-down of the production line for purification is avoided.

### Organic Contaminants

Organic contamination cannot be removed from nickel plating baths by conventional filtering methods. Such forms of contamination may be caused from dust from the air, insufficient cleaning, or the breakdown of organic addition agents during the normal course of operation; sometimes improperly chosen tank linings or rack coatings may contribute to such contamination. This type of impurity is removed by absorption on activated carbon.

The general practice followed is to pump the plating solution into an auxiliary tank where it is mixed with 1—2 lb./100 gal. of activated carbon. The temperature of the solution is raised to 150-160 F., and stirring is carried out for several hours. Filtration results in a clean solution that is fairly free of organic contamination.

During the normal course of operation of a nickel plating bath, a certain amount of solid dirt particles are introduced from various sources such as atmospheric dust, anode sludge,

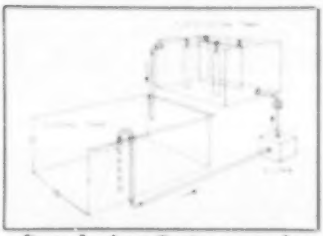

Figure 3. A purification system for nickel plating baths using low current density electrolysis and designed for use with existing equipment which was described before the 34th annual convention of the American Electroplaters' Society. Continuous electrolytic purification eliminates costly shut-down required by chemical treatment methods.

etc. Such suspended matter must be constantly removed to avoid rough or pitted deposits. For continuous operation on production solutions it has been recommended that the entire solution pass through the filter each 2-3 hours of operation.

For economical and efficient filter operation, it is necessary to have sufficient solids capacity so that filtration does not have to be interrupted at excessively frequent intervals in order to clean the filter. The solids capacity should be sufficient to accommodate both the solids occurring in the solution, and filter aid and activated carbon when used.

In continuous filtration, the solution is recirculated from the plating tank, through the filter, and back to the tank. To avoid "short-circuiting" of this flow, it has been recommended[1] that the suction line of the pump be set a little way below the solution surface in one corner of the tank, and the discharge line should go nearly to the bottom of the tank in the diagonally opposite corner. Continuous carbon treatment, utilizing the filter, maintaining the amount of carbon used to a minimum has been found advantageous in certain types of nickel plating operations.

### Bath Analysis

Other steps for proper control of production line nickel baths includes measurement of pH and determination of surface tension, in addition to analysis of main constituents. The pH should be determined frequently, and adjusted in accordance with the recommendations of the process.

In taking samples for analysis, precautions should be used to get a representative solution. One method that is used is to lower a glass or rubber tube slowly into the tank of length equal to the depth of the tank. When the tube touches the bottom it is closed at the top and withdrawn to give a sample representative of all depths of the tank. Several such samples may be taken at different locations in the solution.

A few simple operational precautions and use of proper filtration and purification for production line nickel plating baths should be regarded as a form of insurance; the production man will find it to have a very low cost premium when compared to the cost of lost time and rejected work.

## CHROMATE COATINGS FOR MAGNESIUM

Perhaps the most important single requirement of a protective coating on magnesium alloys is that it provide a base to which paint will have good adhesion over an extended


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period of time. The production man finishing magnesium die cast parts will be interested in four types of chromate treatments given below, which on the basis of recommendations[11] of the Dow Chemical Company are satisfactory for use prior to painting operations.

### I. Chrome Pickle Treatment

The magnesium parts are dipped for ½-2 minutes in a bath composed of 180 g./L. of sodium dichromate ($Na_2Cr_2O_7 \cdot 2H_2O$) and 187 ml./L. of conc. $HNO_3$, the solution being used at room temperature. Parts are held for 5 seconds in the air after removal from the bath, followed by rinsing and drying.

### II. Sealed Chrome Pickle Treatment

The treatment is the same as for the chrome pickle but is followed by a sealing treatment in a boiling bath containing 100 to 150 g./L. of sodium dichromate for 30 minutes.

### III. Dichromate Treatment

Step 1—Dip 5 min. in an aqueous solution containing 15-20% by weight of hydrofluoric acid (HF) maintained at room temperature. Rinse in cold water following this treatment.

Step 2—Boil parts 45 min. in a 10-15% sodium dichromate aqueous solution, or, as an alternate, for 30 min. in this solution saturated with magnesium fluoride ($MgF_2$) or calcium fluoride ($CaF_2$). Following this, parts are rinsed and dried.

### IV. Galvanic Anodize Treatment

Step 1—Same procedure as used in Step 1 in dichromate treatment, described above.

Step 2—The magnesium parts are galvanically anodized at 10 amp./sq. ft. for 10 min. in a bath operated at 50°C - 60°C. (120-140°F.) and made up of 30 g./L. of sodium dichromate, 30 g./L. ammonium sulfate $(NH_4)_2SO_4$, and 10 ml./L. of $NH_4OH$ (sp.gr. 0.88). The magnesium is electrically connected to the steel tank containing the solution to generate the necessary current.

Satisfactory procedures for cleaning the magnesium in alkaline or acid baths must be carried out before applying the chromate treatments. Good paint adhesion is assured under normal condition by absorption of the paint into relatively porous chromate film.

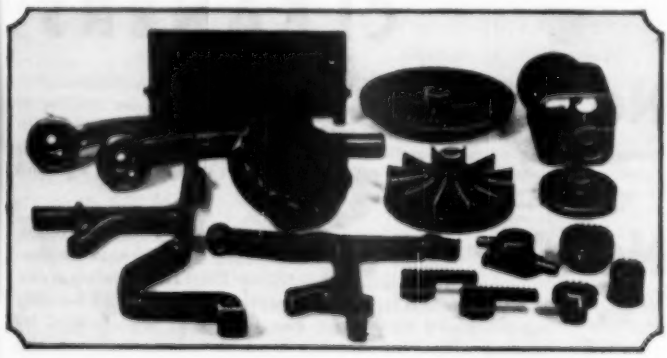
(7) Nixon and Olsen, Plating Oct. 1948
(8) Trans. Electrochem. Soc. **29**, 295 (1916)
(9) **Modern Electroplating**. The Electrochemical Society (1942)
(10) Brudbure and Kinnerman, PLATING p. 458 (May 1949)
(11) Monthly Rev. Am. Electroplaters' Soc. **19**, No. 4, 9 (1932)
(12) Ewing and Gordon, PLATING **36**, (1949)

(5) Monthly Rev. Am. Electroplaters' Soc. **22**, No. 6, 24 (1935)
(6) Trans. Trans. Electrochemical Soc. **45**, 107 (1924)
(7) Weisberg, Metal Ind. (N. Y.) **34**, 451 (1937)
(10) Case, Proc. 34th Conv. Am. Electroplaters' Soc. (1947)
(11) Helling, Proc. Am. Electroplaters' Soc. (1941)
(12) Corrosion Handbook, p. 864, sponsored by Electrochemical Society and published by John Wiley and Sons, N. Y. (1948)

## WORKS MANAGER PROMOTED

A. C. Thompson, formerly works manager of the Bartlett Hayward plant of Koppers Company, Inc., has been promoted to the position of production manager for the Company's Metal Products Division, it has been announced by Walter F. Perkins, vice president and Division general manager.

In his new position, Mr. Thompson will be responsible for production, methods, incentives, and service at both Bartlett Hayward and the American Hammered Piston Ring plants of the Division. Both plants are located in Baltimore.

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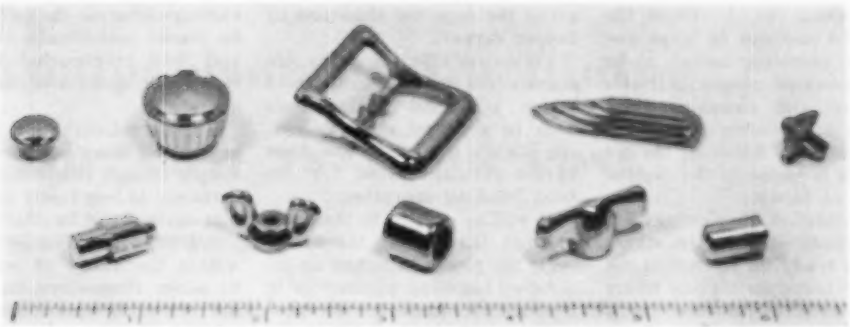

Except for the larger buckle frame, above center, these small zinc die castings can be barrel chrome plated at a very economical figure beyond the price range possible by hand racked plating. These parts give some idea of the range of sizes and shapes which are practical for bulk plating cycles.

# Barrel Chrome Plating Small Die Cast Parts Cuts Finishing Costs

By E. F. BERRY
Midwest Chrome Process Co.
Detroit, Mich.

CHROMIUM plating very small parts constitutes a troublesome, costly problem when any hand operations whatever are involved. The reason for this is readily apparent. The small piece is hard to hold, it seldom has any conveniently placed holes or crevices to permit easy racking, and requires operators with unusually nimble fingers. Production is slowed and costs rise way out of proportion.

In recent years methods have been developed whereby small steel and brass parts can be chromium plated in bulk, that is, without racking or individual handling throughout the chromium plating cycle. This development has widened the use of chromium plating on many small parts that are now taken for granted.

For example, the screws which are used on the trim of the modern motor car are chromium plated in bulk at a very economical figure which permits their widespread use in the automotive industry. Countless other small steel and brass parts fall in the same category. In fact, barrel or bulk plating of small steel and brass screw machine parts and stampings is now enjoying rather widespread and popular use.

Barrel or bulk chromium plating technique has progressed a step or two further with the development of methods for finishing small parts made of stainless steel. This latter metal has achieved wide popularity due to its noncorrosive properties. However, the color of stainless steel does not match that of chrome and in the case of assemblies, it is desirable to chrome flash the stainless parts. This can be done in bulk at little expense.

The latest and most recent development in the specialized field of barrel chrome plating is that recently introduced by the Midwest Chrome Process Company, whereby small zinc base die castings can be bulk finished. Heretofore, small die castings have been the stepchild in the field of bulk finishing processes with the inevitable result that steel and brass have replaced die castings in a number of instances where die castings could have been used to a good advantage. The big "fly in the ointment" was the chromium plating. The steel and brass parts could be plated in bulk whereas die castings must necessarily be handled individually and placed on racks.

At this point it might be wise to define what is meant by barrel or bulk plating. Barrel plating is simply a bulk process wherein the die castings are not touched by hand. The typical cycle for small parts could be described as follows:

Operation No. 1. Place the small die castings in large mechanical tumbling barrels along with abrasive stones, suitable lubricant and cleansing compounds and water, rotate the mass until the finish on the die castings is honed to the desired degree of luster.

The finished die castings are then separated from the stones and are ready for operation No. 2 which is copper plating where the parts are immersed in a copper plating solution and are given the required thickness of copper deposit.

Following this the parts are transferred to operation No. 3 which is nickel plating here done in a barrel also. Following nickel the parts are then barrel chrome plated for the final finishing operation.

It will be evident to the reader that throughout the entire cycle the pieces have had no individual handling whatsoever in contrast to the old accepted methods of plating small die castings wherein the parts must be placed individually on racks and then transported through the copper, nickel and chromium operations.

The barrel chromium plating method as described above is a simple though efficient one and certainly is less costly and definite savings can be effected provided the pieces themselves fall within the range of smallness to adapt themselves readily to barrel plating operations.

"How large a piece can be barrel chrome plated?" is the common question. This is a difficult one to answer for the reason that parts of various shapes behave differently throughout the plating cycle. *Weight is not too great a factor and this holds true for size as well. Parts ranging in size from two to three inches long by approximately ¼" diameter have been successfully plated as well as very small pieces measuring 3/16" diameter by ¼" long.*

Generally, the smaller the part the easier it is to plate and, most important, the lower is the unit cost and subsequent saving over hand rack plating. As the size increases, the number of parts which can be plated in the equipment decreases. This must necessarily raise the unit cost in direct proportion. As size increases, there is a further limitation on the number of pieces which the plating barrel will accommodate until the point is reached where it is a toss up whether to barrel plate or hand rack plate. In other words, there is a line of demarcation in figuring costs.

As an example of this, the accompanying illustration of small plated parts can throw some light on this matter. Note the buckle frame — upper center. The cost of barrel chrome plating for this part is about the same as for rack plating. The small parts shown in the same illustration are another matter, however. These parts and others like them can be plated at a very economical figure completely beyond the price range of hand rack plating.

(Continued on Page 69)

CUT SPRAY PAINTING COSTS

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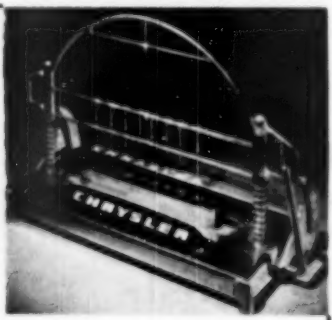


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Often one color after another can be accurately wet painted on many concave, convex or irregularly-shaped three dimensional parts. Eliminate makeshift masking devices by using our accurate, snug-fitting

**ELECTRO-FORMED METAL MASKS**

**Made by Patented Process**

**LIP TYPE • PLUG TYPE • BLOCK CUTOUT**
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Faster, better, more economical than masking tape. Clean, sharply defined letters and decorative effects are obtained on intricately designed die castings, stampings, plastics, etc. Accurate control of painted areas with no fogged edges. Avoids after wiping or buffing off of overspray.

The "loose" inside of letters and numerals, such as "O" and "6," are held in position by arched bridging to effect perfect characters without objectionable "ties."

Can be fitted on fixtures on production lines. Used in production of hundreds of nationally-known products.

Shown above is a plug-type masking fixture to plug and keep clean the depressed letters in an automotive name plate while painting the background. To compensate for irregularities in the molded parts the fixture is cam-locked for pressure and the plugs for each individual letter are spring loaded.

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I am interested in metal masking shields. Please send without obligation:

☐ Further information ☐ Quotation on masks for parts (or prints) which I am forwarding

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# A Comparison of Machining Of Die Cast vs. Sand Cast Pump Covers

THE use of a die casting to replace some less accurate form of casting or fabrication does not necessarily imply that all machining will thereby be eliminated. However, it is generally true that the character and extent of machining will be sharply affected.

Take, for example, the die cast cover for a hydraulic pump manufactured by Pesco Products Division, Borg - Warner Corp. Some covers of similar design are currently being sand cast because of the limited quantities in which they are to be produced, and its is therefore possible to draw some rough comparisons.

Some machining is definitely eliminated: this includes the boring of the stepped diameter seats for the gear shafts, either for size or location. These critical dimensions, used as formed in the die casting, are bored in a two-stage operation on the sand castings, using a Warner & Swasey No. 3 turret lathe. Tolerances must be held within .002.

Not only is this operation dispensed with on the die cast covers, but the cast holes are accurate enough to serve as locating surfaces for facing the cover. Figure 1 shows the Potter & Johnston turret lathe on which the major part of the machining on the die cast cover is done.

A comparison of Figures 1 and 2 will reveal that five stations on the turret are used for the sand cast machining, whereas only a single station and a

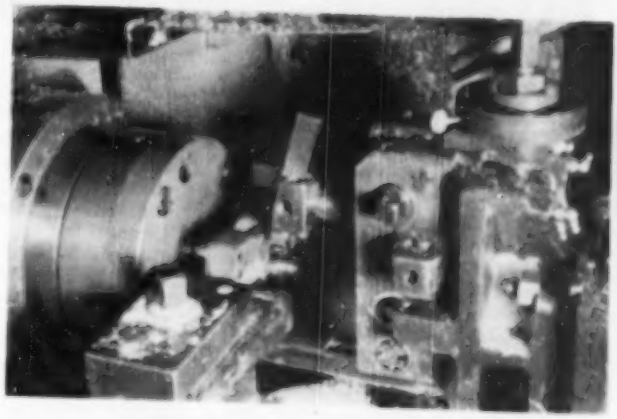
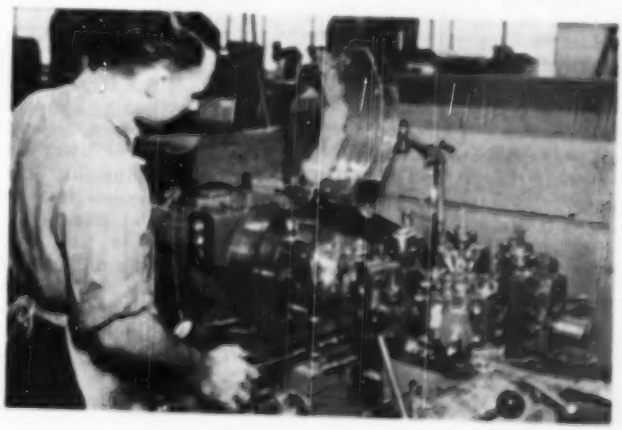


Figure 1, above. One station and a simultaneously feeding cross slide are the only machining operations on the die cast pump cover, aside from drilling one small, angular hole and tapping two others.

Figure 2, below. By comparison, it can be seen that five stations are used in machining a similar sand cast pump cover. Two shaft seats are bored, top and bottom surfaces faced, four holes drilled and two tapped. After boring one shaft seat, it is necessary to stop the machine and index the part by hand before boring the second seat.



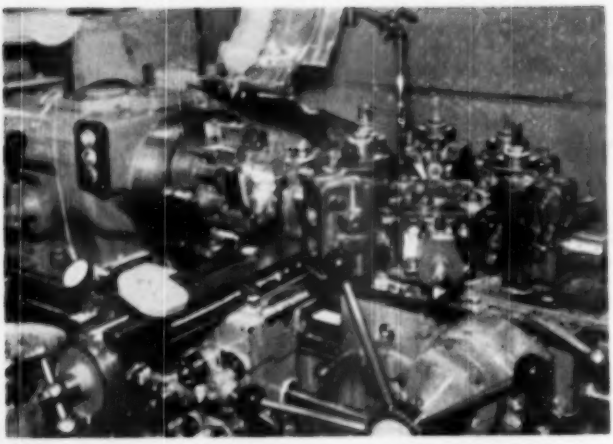


Figure 3. Close-up of the machining setup for a sand cast hydraulic pump cover. A piece like the one being machined can be seen on the cross slide.

cross slide feeding simultaneously are used for the die casting. The difference involved here is not only one of production tooling and setup, but of the amount of production time consumed by each sequence.

On the sand casting, one shaft seat is bored with a formed cutter, and then the casting is indexed by hand and the machine started again to cut the second shaft seat. All of this is dispensed with on the die casting.

The amount of stock removal, and the problems in locating accurately in a fixture, make it necessary to face the top and bottom surfaces of the sand cast covers separately. The amount of stock to be removed is so slight in the die casting that both faces can be cut simultaneously by a straddle tool on the cross feed. This is a "free" operation obtained while the tool on the turret is cutting the ring groove which cannot be cast.

Only subsequent machining on the die cast body is to drill the tiny, diagonal hole between the shaft seats. This hole could not be cored because of its location, angle and small size. It is also necessary to tap a pair of holes which have been cored.

These holes are cored to accurate size and location, needing neither reaming nor boring prior to tapping. A simple clamping type fixture placed under a single spindle tapping head "free hand" is sufficient to assure proper perpendicular entry of the tap into the hole.

On the sand casting, all four holes for assembling the cover to the body are drilled before two of them are tapped.

It is to be observed that the type of machining which is done on a die casting is almost always of the finish variety, and seldom involves a roughing cut. The amount of stock removed is usually small enough that faster spindle speeds and rate of feed can be employed.

Spindle speed on the Potter & Johnston turret lathe for the die cast cover is 1445 rpm. Carboloy tipped tools are used throughout. Longer tool life is reported on machining die castings because there are neither hard spots nor sand inclusions to dull the tools.

## NEW EDITION OF LATHE OPERATORS' HANDBOOK

Publication of the new and revised edition 49 of the Book "How to Run a Lathe" is announced by the South Bend Lathe Works. Containing 128 pages and more than 350 illustrations on the care and operation of metal-working lathes, this book may be used as a reference by experienced machinists or as a text by the apprentice or shop student.

Eleven chapters cover various types of work including the correct installation and leveling of the lathe, grinding cutter bits, turning, boring, thread cutting, taper turning, drilling, reaming, and tapping. Clearly written in simple, nontechnical language, the instruction material is easy for the beginner to understand.

The first edition of this book was copyrighted in 1914. Each succeeding edition has been revised and improved to include suggestions and ideas that have been submittted by hundreds of practical shop men. New material added in the latest edition includes machinability ratings and cutting speeds for various kinds of steels; standard tolerances for press fits, running fits, push fits, and sliding fits; allowances for finish turning, filing, polishing, grinding, reaming, lapping and honing; and tooling dimensions for South Bend Lathes.

Edition 49, "How to Run A Lathe," is available in paper binding at 25c, or in imitation leather fabrikoid binding at $1.00 a copy postpaid. Order from the South Bend Lathe Works, South Bend 22, Indiana, U.S.A.

## OPERATE NEW FURNACE

Diamond Alkali Company has put into full-scale operation a new, 50,000-ton furnace at its Cincinnati, Ohio, silicate plant.

W. H. Evans, Diamond's general manager of silicate operations, in announcing the installation, has explained that the addition of the new furnace will increase production of silicate of soda and related products at the Cincinnati plant by 50%.

## UNITED CHROMIUM LICENSED TO MAKE NEW PRIMER

The Princeton Paint Laboratories, developers of Aviation Primer Number 10, have licensed United Chromium, Inc., of 51 East 42nd Street, New York City, to manufacture and distribute this organic coating. Aviation Primer Number 10 eliminates the necessity for etching such hard-to-coat metals as aluminum, magnesium, zinc, and stainless steel. The product will now be marketed under the trade name Unichrome Primer A.P. No. 10.

## OSBORN ELECTS L. F. MILLER

Franklin G. Smith, president of The Osborn Manufacturing Company, Cleveland, has announced the election of Leon F. Miller as vice president in charge of sales and engineering of the company's Foundry Machinery Division.

Mr. Miller joined the company in January, 1929, after having attended Case Institute of Technology in Cleveland. For the last six years, he has been sales manager, and for ten years prior to that was sales engineer in Ohio and the Southern states.

## NEW PRODUCTION OF CHROMIC ACID

Better Finishes and Coatings, Inc., Newark 5, N. J., is now shipping chromic acid flake, technical grade, produced in newly installed electro-chemical equipment at its Newark plant. Analyses by independent Testing Laboratories indicate that the new production is low in chlorides, sulphate and insolubles and exceeds U. S. Government Specification AN-A-21.

Chromic acid production is the first of a series of steps being made by Better Finishes & Coatings, Inc., to expand its line of finishes, peelable plastic coatings, stop-off and masking compounds, etc., being made for the organic finishing, electroplating and metal-working industries.

## LITERATURE & SERVICES IN THIS MONTH'S ADS

(Continued from Page 8)

A-16. GRIES REPRODUCER CORP. Besides bulletins on its production facilities in the field of small zinc alloy die castings, Gries Reproducer offers samples.

A-17. LINDBERG ENGINEERING CO. The Fisher Furnaces Division of this company offers detailed information on its melting furnaces and holding pots for use with die cast alloys.

A-18. WIRE COATING AND MANUFACTURING CO. A descriptive circular about the company's products, including copper plating materials and zinc dips is available.

A-19. D. J. MURRAY MANUFACTURING CO. Finishes will be put on sample parts by the company in its Murco tumbling barrels, used to burnish, deburr, clean, and polish metal surfaces.

A-20. AMERICAN TANK AND FABRICATING CO. This company offers complete information on its crucibles, ladles, and skimmers for magnesium.

A-21. UNITED CHROMIUM CO. Literature on how to give die castings corrosion resistance and chromium-like appearance by a dip process is offered.

A-22. ALMCO SUPERSHEEN DIV. Detailed information can be had on the use of the DBO-1 tumbling barrel and other finishing barrels.

A-23. Surface Combustion Corp. Specifications are available on the company's stationary and tilting non-ferrous melting furnaces.


"Oakite's new method for cleaning brass and copper before nickel and chrome plating is tops!"

From Connecticut to California, electroplaters are enthusiastic about the NEW Oakite brass-cleaning method that gives good protection against tarnish along with effective removal of oils and buffing compounds. Here are a few comments:

**Wonderful cleaner for brass . . . Results have been excellent . . . Not a single reject on brass and copper work in two months . . . Good cleaning combination . . . All parts plate perfectly . . . Worth its weight in gold . . . No discernible tarnish during anodic cleaning . . . Rejects at lowest point ever . . . Nickel plate extremely adherent, very bright and lustrous . . . Getting excellent results in automatic plating machine . . . 15 to 20 seconds reverse did perfect job . . . Much brighter plating, much better adhesion . . . Could not detect any tarnish . . .**

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MURCO Tumbling Barrels are preferred today by plants that deburr, burnish, clean, polish, and smooth-surface metal and plastic parts on a mass-production basis. With its variable speeds, you have a wide range to meet various operating conditions and requirements . . . the special brake mechanism stops the barrel in any position, as well as facilitates loading and unloading . . . prevents accidental dumping of loads.

SAMPLE PARTS PROCESSED . . . .

At no charge or obligation. Write today for complete details.

D. J. MURRAY MANUFACTURING CO. *WAUSAU, WIS.*

# Useful Literature

**For additional information on the products appearing on this and the following pages, mark the key number of the item on the card bound into this issue. Drop the card in the mail—no postage is required.**

**No. 28—Drill Jig Bushings:**

Standard drill jig bushings and liners are presented in a new catalog B-649 available from Colonial Bushings, Inc., Detroit. Dimensions and design data are included.

**No. 29—Where to Use Magnesium:**

A series of case histories is used to dramatize the successful use of magnesium in a new booklet, "How Magnesium Pays" available from the Dow Chemical Company.

**No. 30—Gray Metallic Finish Has Maximum Mar-Resistance:**

A technical data sheet from Standard Varnish Works offers information concerning the company's Gray Metallic No. 7302 finish, said to have maximum mar-resistance. It is recommended for business machines, and electrical, heating and laboratory equipment.

**No. 31—Hydraulic Oil Purifiers Reduce Down-Time of Die Casting Machines:**

The use of hydraulic oil filters to improve the efficiency of die casting machines and other hydraulically-operated equipment is discussed in a folder from Honan-Crane Corp., Lebanon, Ind. Reduction of down-time and repairs through the elimination of sludge and oil contamination is described and the equipment is illustrated.

**No. 32—Chemical-Resistant Coatings:**

A four-page folder on chemical-resistant coatings for maximum chemical, moisture and rust resistance is available from The Wilbur B. Williams Co., Boston.

**No. 33—Abrasive Belt Techniques Described and Illustrated:**

A 36-page booklet containing case histories and technical data, describes and illustrates many special techniques for using abrasive belts for a variety of materials. This well-illustrated publication shows operations clearly, and is available from Minnesota Mining and Manufacturing Co.

**No. 34—Two Articles on Tool Grinding:**

Two short articles on tool grinding, and a chart of grinding wheel specifications are contained in Vol. 41, No. 1 of "Grits and Grinds" published by the Norton Company. These articles are: "Correct Tool Sharpening Means 'Five Star' Performance" and "Simplified Cutter and Tool Grinding."

**No. 35—Two File Folders on Metal Cleaners:**

An alkaline, non-etching aluminum cleaner and a reverse current electrocleaner for steel, copper and copper alloys are discussed in two file folders available from The Metal Industries Department of The Diversey Corp., Chicago. These pieces of literature contain information on the characteristics, applications and production records of these products.

**No. 36—Explanatory Bulletin on New Combustion Safeguard:**

An explanatory bulletin on the new Flame-otrol combustion safeguard for oil and gas fired furnaces, ovens and other heating equipment has just been released by the Wheelco Instruments Co., Chicago.

**No. 37—One-Coat Finish for Aluminum, Zinc Die Castings, Etc.:**

A new type of synthetic coating suitable for application to either ferrous or non-ferrous metals is introduced in a folder from H. Forsberg Co., Cleveland. It may be used either clear or pigmented, and provides a one-coat primer-sealer-bond for rust-proofing ferrous metals, or as either a primer or finish coat for aluminum, zinc die castings and other non-ferrous metals. Name of this product is XIM Flash Bond.

**No. 38—Hollow Mills with Two Forms of Teeth:**

Specifications and prices for a complete series of hollow mills are contained in new Catalog No. 50 from Reltool Corp., Milwaukee. Made of high speed steel, these hollow mills are available with two forms of teeth: undercut teeth for milling steel and straight teeth for non-ferrous metals.

**No. 39—Adjustable Spindles for Multiple Spindle Drilling, Tapping:**

Adjustable spindle multiple drilling and tapping heads are introduced in new bulletin No. 35 from Ettco Tool Co., Brooklyn, N. Y. These units, available with 2, 3, 4 or 5 spindles, are adjustable from minimum center distance of 1-1/16" to a maximum center distance of 7¼".

**No. 40—Facilities for Die Casting Aluminum:**

Facilities of the S.U.S. Die Casting Co., Logansport, Ind., for engineering, producing and finishing aluminum die castings are described in a folder.

**No. 41—Catalog of Drilling, Reaming & Punching Tools:**

Listed and illustrated in new catalog No. 102 from Whitman & Barnes, Plymouth, Mich., are tools for drilling, reaming and punching. Included are drills and reamers made of high speed, carbon, cobalt steels and tungsten carbide and interchangeable punches made of carbon and high speed steels.

**CIRCLE NUMBERS ON THE CARD AND MAIL!**

**No. 42—Socket Screws of High Tensile Alloy & Stainless Steel:**

A new 16-page socket screw bulletin, No. 400, has been received from Parker-Kalon Corp. It contains engineering data on various P-K socket screws, both high tensile alloy and stainless steel, together with a complete list of standard sizes of each. Stripper bolts, pipe plugs and hex keys are also covered.

**No. 43—Comprehensive Carbide & Cast Alloy Products Catalog:**

The Vascaloy-Ramet Corp. has issued a 92-page catalog said to be the most comprehensive presentation of carbide and cast alloy products ever made. A partial list of products included are: carbide tools, blanks, wire drawing dies, drills, end mills, blades, toolholders and inserts.

**No. 44—Fine Grain Size, More Cutting Edges in New Abrasive:**

Information concerning Prozite, a new abrasive material which is used as the basis for a line of buffing and polishing compositions, is available from The Prozite Division, Gerity-Michigan Corp., Adrian, Mich. Special features of the new abrasive are reported to be finer grain size and more cutting edges.

**No. 45—Ball Burnishing Materials:**

A catalog released by The Abbott Ball Company of Hartford, Conn., contains data about Abbott burnishing materials, including specially-shaped balls. Also included are sections on bearing balls.

**No. 46—Impregnation of Castings by Batch Immersion:**

Impregnation of castings by a low-cost batch immersion process is described in a handy folder containing a great deal of technical data from Western Sealant, Inc., Culver City, Cal.

**One Lacquer, so clear it's invisible,**

**with multiple protection for . . .**

**Dulac Clear Universal Lacquer #462**

● Here's an M&W finish that permits accurate retention of all desirable surface qualities of most metals . . . that adds lasting protection against heat, cold, weather, corrosion, stain and perspiration — Dulac Clear Universal Lacquer #462. It's formulated to give good adhesion with either the spray, dip or brush method. And it fits into fast production schedules because in five to ten minutes this successful general purpose lacquer dries out of dust . . . hardens in one hour. For complete information, write for Technical Data Bulletin 110 or let an M&W technical consultant discuss your requirements privately with you.

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**MAAS & WALDSTEIN COMPANY**

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MANUFACTURERS OF INDUSTRIAL FINISHES

# NEW Products

**For additional information on the products appearing on this and the following pages, mark the key number of the item on the card bound into this issue. Drop the card in the mail—no postage is required.**

## MOLYBDENUM LUBRICANT FOR HIGH TEMPERATURE LUBRICATION

An important development in the science of lubricating high-speed, high-temperature and high-pressure bearings, pioneered by governmental aeronautical laboratories and large industrial concerns, has been the use of the rare metal molybdenum in place of, or supplementing regular lubricating oils and greases.

Molybdenum is an extremely "greasy" metal, practically indestructible at high temperatures and pressures, certain forms of it having the peculiar faculty of "plating" itself firmly to any friction surface. This forms a permanent friction-supporting film which cannot be "squeezed out" by any amount of pressure, thus protecting the bearing against scoring or seizing even after all the oil has been burned out.

Molybdenum lubrication has now been made available in a form suitable for use in any conventional lubricating system, by a new development of the Lubricants Division of The Lockrey Company, College Point, N. Y., which is now placing on the market a new molybdenum-base lubricant called "Liqui-Moly."

This can be used alone, or added directly to crank-case or other oils which carry it to the friction-surfaces, where it "plates out" on the metal, providing a permanent low-friction anti-seizing coating. According to the company, actual tests have shown that friction-surfaces running at high speed and under heavy pressure will heat up from 300 to 504 per cent faster with ordinary lubricating oil than when running dry with only "Liqui-Moly," and moreover that the temperature rise with oil is continuous until failure and seizure, whereas with "Liqui-Moly" it reaches a stabilization point and then usually recedes.

For additional information circle No. 1 on the attached card.

## PYROMETERS FOR PANEL MOUNT

Three sizes of pyrometers for panel mounting, with unbreakable, clear plastic, one-piece front covers, are offered by Assembly Products, Inc. Eight ranges cover temperatures from minus 75°F to 3000°F with corresponding ranges of minus 60°C to 1600°C.

Both fahrenheit and centrigrade are shown on the dials. Standard calibrations are for chromel-alumel and for iron-constanton thermo-couples, but other types including platinum couples are available on special order.

With automatic cold junction compensation the high resistance millivoltmeters movements have copper correction for highest accuracy. For additional information circle No. 2 on the attached card.

## UNIT TESTS ALIGNMENT TO GAGE BLOCK ACCURACY

The Watts 18" Auto-Collimator now introduces methods successfully employed in the optical industries to the machine tool and general engineering field.

The instrument produces a beam of parallel (collimated) rays of light and measures to the accuracy of one-half second of arc any deviation between the original direction of the beam and its reflection by a mirror of polished surface.

It is, for example, possible to produce a chart showing waviness in a surface plate, machine bed or shaft, to an accuracy of better than .000004", and with the use of simple accessories such as gage blocks, angle gage blocks, reflecting squares, mirrors, etc., a large number of extremely accurate angular measurements can be taken directly.

Linear measurements can be determined by simple computation without regard to distance and without wear, distortions due to temperature changes, or other factors normally affecting accuracy of measurement and inspection.

The Auto-Collimator is distributed exclusively in the United States by Ingis Equipment Co., Chicago. For additional information circle No. 3 on the attached card.

## MEDIUM-WEIGHT DRILLING MACHINE HAS 25-INCH SWING

A new medium-weight drilling machine with a 25" swing, has been introduced by Sibley Machine & Foundry Corp., South Bend, Ind. Known as the Model E-25, the new 765 lb. drilling machine has been developed to fill the gap between the larger heavier type and the light bench class.

Design features include its big swing of 25", a variable speed drive from which the exact spindle speed may be obtained for any size drill from ½" to 1" and an extra large rectangular 18" x 26" table with coolant trough.

A sensitive drilling machine powered by 1½ hp axial air gap type motor, the new Sibley is suited for high speed production. Rated capacity of machine is ¾" in steel and 1" in cast iron.

A tachometer on front of machine provides accurate reading of speeds. Five options of spindle speeds each with a 4 to 1 ratio are available, ranging from a low of 206-825 rpm to a high of 540-2160 rpm, with 3 phase 60 cycle motor. A speed chart on side of machine shows proper speeds for different drill sizes.

For additional information circle No. 4 on the attached card.

## RENEWING PROCESS FOR PHILLIPS SCREWDRIVERS

The Zephyr Manufacturing Co. of Inglewood, Calif., have announced a method of renewing Phillips screwdrivers and screwdriver bits that have become worn or broken in service.

Drivers renewed by this process conform to Phillips design and are reported to equal new tools in service. Original hardness is not affected by the process, though length is slightly reduced. Most drivers can be repeatedly renewed.

Zephyr Manufacturing Co. are licensed under Phillips patents. Renewed drivers conform to original design and tolerances. For additional information circle No. 5 on the attached card.

## DIAL BORE GAUGE

Utilizing a design similar to that employed in the construction of their inside micrometers, the Rimat Machine Tool Company of Glendale, Calif., has developed and is producing a new dial bore gauge. The new tool will give the diameters of internal grooves for "O" rings, snap rings, oil rings, etc., as well as diameters of straight bores.

Operator skill required in its use is a minimum and deep holes are said to be measured as readily as shallow ones. Standard instru-

ments are manufactured to measure all diameters from ½" to 6". Special models are produced to meet unusual customer requirements. For additional information circle No. 6 on the attached card.

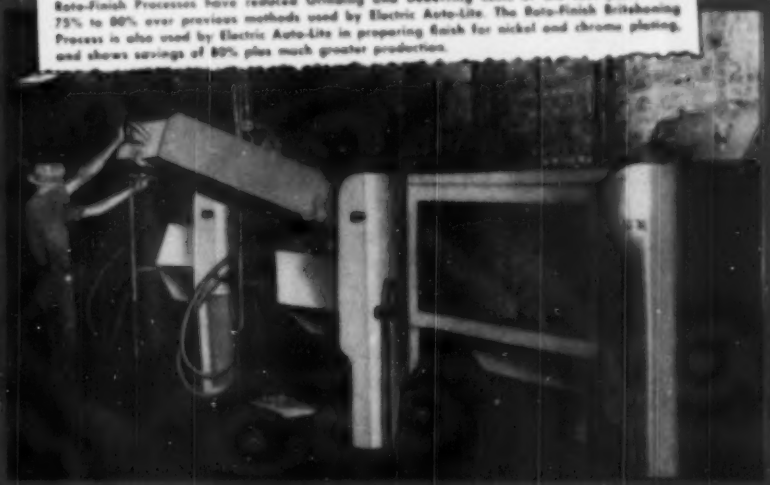
*(Continued on Page 56)*

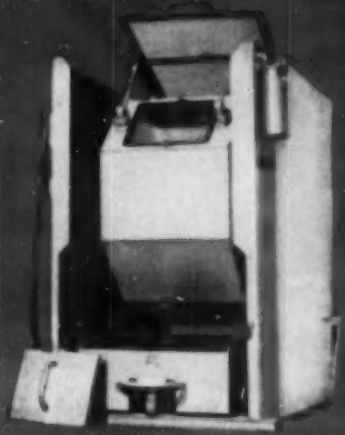
# Rolling Stones THAT GATHER

**CASE HISTORY NO. 382**

**THE ELECTRIC AUTO-LITE CO., DIE CAST DIVISION, Woodstock, Illinois.**

Roto-Finish Processes have reduced Grinding and Deburring costs of die cast parts from 75% to 80% over previous methods used by Electric Auto-Lite. The Roto-Finish Britehoning Process is also used by Electric Auto-Lite in preparing finish for nickel and chrome plating, and shows savings of 80% plus much greater production.





ROTO-FINISH MODEL CW22-1
Rubber lined cylinder. Note the safety screen and waterproof forward and reversing switch.

**Reduce your finishing costs from 25% to 80% with Roto-Finish Processes!**

The Roto-Finish system of controlled rotary action Grinds, Deburrs, Polishes, Britehones and Colors metals and plastics faster at less cost than other methods.

The installation cost of Roto-Finish equipment is surprisingly moderate. It will pay for itself quickly in producing higher quality finishing . . . increasing production and lowering finishing costs. *Roto-Finish Processes do not require expensive exhaust equipment.*

When you install Roto-Finish equipment in your plant you not only profit by using the original Roto-Finish Processes but you have at all times the services of a competent engineering staff who will assist you in solving your mechanical finishing problems.

## *Make us prove it!*

Make us prove the Roto-Finish Processes at no cost to you! The facilities of our Sample Processing Department, under the direction of especially trained engineers, are at your disposal. Send us a sample lot of your parts for finishing (include finished part for guide). Roto-Finish will process the parts—prepare a processing report which will then be returned to you with the finished parts—no obligation. Write today—find out for yourself how Roto-Finish Processes will reduce your production costs.

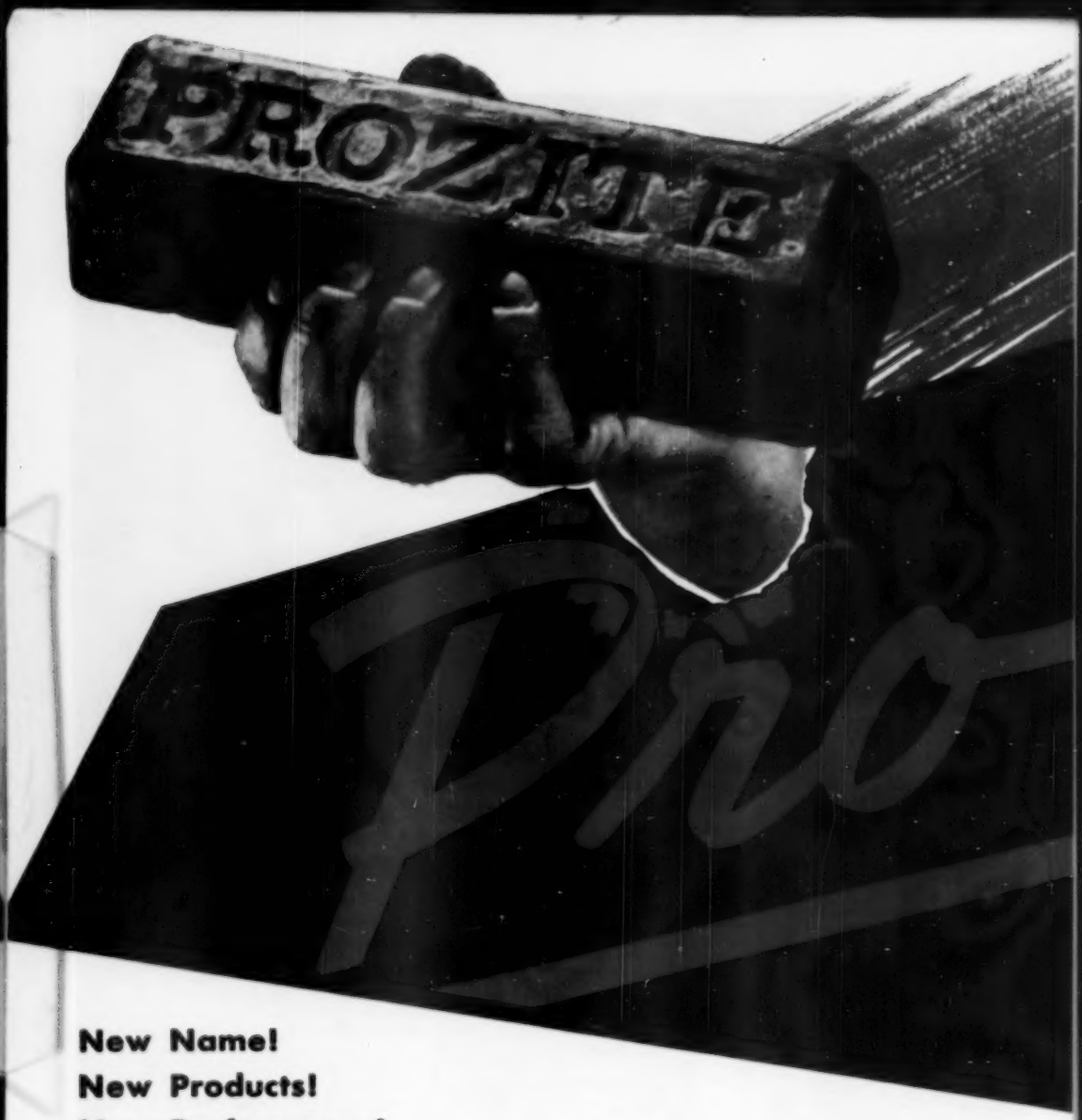
PRECISION FINISHED by ROTO-FINISH

**Roto-Finish COMPANY**

KALAMAZOO, MICH.

ORIGINATORS OF THE ROTO-FINISH PROCESSES

FOREIGN REPRESENTATIVES: Melbourne, Australia — A. Flowell Pty. Ltd. • London, England — Roto-Finish Ltd., 22 Bishopsgate • Den Haag, Holland — N. V. Roto-Finish Maatschappij




## New Name!
## New Products!
## New Performance!

### WHAT IS PROZITE?

Prozite is a remarkable new abrasive material. Its outstanding characteristic is fine grain size presenting many more cutting edges for faster work and more mileage. Prozite compositions include entirely new bases and lubricants providing better performance, exceptional ease of cleaning and brighter color.

### WHO IS PROZITE?

The resources of three major companies have been pooled to develop, manufacture, test and distribute the first totally new and better line of buffing and polishing compositions introduced in the history of the finishing industry.

1. POOR & COMPANY, Waukegan, Illinois — *research and development* of Prozite products in one of the finest and most complete laboratories in the finishing field.

2. CALUMET AND HECLA CONSOLIDATED COPPER COMPANY, Calumet, Michigan — *manufacturer* of Prozite products with gigantic bulk material handling and processing facilities.

3. GERITY-MICHIGAN CORPORATION, Adrian, Michigan — *exclusive national sales agent* for Prozite Compositions, and one of the largest metal finishers in the country. All Prozite products are shop-tested in this plant.

# BUFFING AND POLISHING COMPOSITIONS

**PROZITE COMPOSITIONS**

- Go Farther
- Last Longer
- Clean Easier
- Cost Less to Use
- Produce Brighter Finish

**A COMPLETE LINE**

Prozite® Buffing and Polishing Compositions in Bar or Liquid Form . . . Pro-Brite® Lime Finishes . . . Pro-Lube® Lubricants for Abrasive Belts and Wheels.

Address all inquiries to

**THE *Prozite* DIVISION**

Gority-Michigan Corporation Adrian, Michigan

*Trade Marks Registered U.S. Pat. Off.

It costs more per pound. But it cleans better, goes farther, cleans more surface per pound of cleaner; it's an economical buy.

Parco Cleaners are specially formulated to clean and condition metal surfaces to provide a better base for finishes. They're formulated to reduce cleaning time, operating temperatures, and amount of cleaner used.

In the Parco Cleaner line there's bound to be one that's especially suited for your requirements. A production test with the Parco Cleaner that fits your need will save you money on cleaning. Write today!

**Emulsion and Solvent Type**—Excellent for removing oil, grease and soil from metal surfaces. Spray and immersion types.

**Acid Type**—Want to remove rust and scale from iron and steel? Here are cleaners to do the job efficiently, economically.

**Alkaline Type**—A wide range of light and heavy duty, spray and immersion types, for removing oil, grease and soil from metal surfaces.

*Bonderite, Parco, Parco Lubrite—Reg. U. S. Pat. Off.*

Parker RUST PROOF COMPANY
2189 E. Milwaukee Ave.,
Detroit 11, Michigan

**BONDERITE**—Corrosion Resistant Paint Base • **PARCO COMPOUND**—Rust Resistant
**PARCO LUBRITE**—Wear Resistant for Friction Surfaces


## NEW PRODUCTS

*(Continued from Page 52)*

### STEEL HARDENING COMPOUND

A new steel hardening compound has been introduced by the Doughty Laboratories, Inc., New York City. This product, known as Hard'N'Tuff, is said to impart to a mild 1020, or a tool steel drill, at least 300 per cent increase in tool life by adding ingredients which have both a nitriding and alloying effect.

By fusing this chromium-rich compound into the steel, a hard outer surface is formed which is highly impregnable, and resistant to wear, corrosion and high temperatures. The core, however, remains tough and flexible.

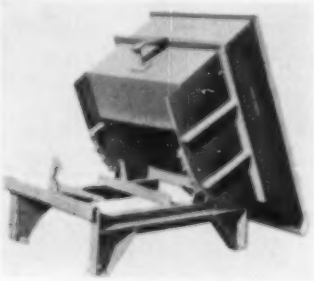
Hard'N'Tuff is packed in 3, 5 and 10-lb. containers, although 25, 50 and 100-lb. drums are also available, to quantity users, with suitable discounts.

This compound can be used on all types of tools, parts, dies, and other low carbon or high speed materials. The hardening procedure involves heating the tool to a cherry red color, dipping or rolling it in the compound and letting the latter fuse for 15 to 30 seconds. The tool is then reheated to a cherry red color and quenched quickly in cold water. If a greater depth of hardness is desired, the above steps can be repeated, except that additional compound is fused onto the part before final additional heating and quench steps. For additional information circle No. 7 on the attached card.

### HEAVY DUTY SELF-DUMPING HOPPER

To meet special requirements Roura Iron Works, Inc., has developed and built for the Buick Motor Division Foundry, at Flint, Mich., special one-yard capacity heavy-duty self-dumping hoppers.

The hopper bodies are built of ½" plate throughout; they are specially designed to withstand warping when handling red hot



sprues and castings. This new heavy duty Roura hopper is built to fit any standard type lift truck and, like all other Roura self-dumping hoppers, can be unloaded by the operator of the truck lifting the patented instant release handle. For additional information circle No. 8 on the attached card.

**CIRCLE NUMBERS ON THE CARD AND MAIL!**

### THREE FINISHING MATERIALS INTRODUCED

Among the new products announced recently by Allied Research Products, Inc., Baltimore, are a powder form of an Iridite coating for the corrosion protection of zinc and cadmium, a new Iridite finish for aluminum and a radically new type of organic brightener for zinc plating solutions.

The new products were introduced to the sales-engineering staff at a three day sales meeting held in Baltimore. At the same time a preview of the research program for the development of new products was presented to the group.

Iridite No. 8-P, the new powdered Iridite, will achieve appreciable savings in shipping costs and eliminates the need for returnable packaging.

The new finish for aluminum, Iridite Alcote, provides corrosion resistance, paint adherence characteristics and abrasion resistance.

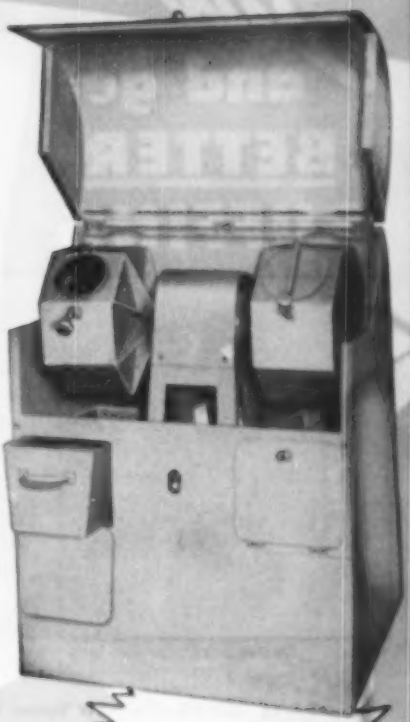
The zinc plate brightener compound will be called ARP No. 3 and will be supplied in liquid form for use in any type of zincc plating bath. It is claimed that the new brightener produces better results at lower cost than established materials now on the market. For additional information circle No. 9 on the attached card.

*(Continued on Page 59)*

# New in Precision Barrel Finishing

## ALMCO Supersheen

### MODEL DBO-1



## FOR A BETTER FINISH FASTER ON SMALL PRODUCTION RUNS

The *newest* addition to America's Most Versatile Line of Precision Barrel Finishing Equipment. Ideal for small shops, small production runs, experimental processing. All welded steel construction. Sturdily built to take it! Easily loaded and *mechanical* unloading and separating mean *lower* operating costs. *Removable* watertight drawers with drain plugs eliminate need of drainage facilities. Safety hood and chain guard assure *maximum* safety.

It's the last word in compactness, advanced precision barrel design. Write today, Dept. D-3, for full DBO-1 details.

**ONLY $490.00 F.O.B. Albert Lea, Minn.**
**PROMPT DELIVERY**

*Cuts Costs up to 90%*

*Free Engineering Clinics*

**Eight *strategically* located SUPERSHEEN Engineering Clinics have been established to provide you with *quicker* and *better* sample processing—and to keep you *fully* informed of the latest developments in precision barrel finishing. These are YOUR clinics to use *without obligation*. Bring us your problems and actual parts for sample processing and complete production cost data—OR you may send parts for sample processing if it is not convenient to personally visit the Clinic nearest you.**

**The SUPERSHEEN line consists of (1) Advanced Design *Precision* Deburring and Finishing Barrels in sizes from 8" x 16" up to 60" x 30". (2) *Automatic* loading, unloading and separating equipment. (3) A *vastly superior* grinding and finishing medium in two grades and 9 sizes.**

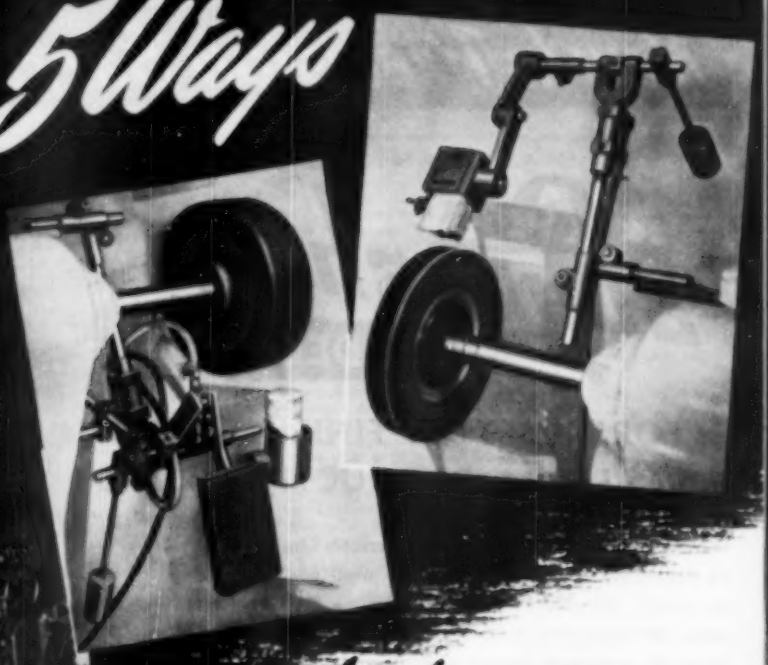
**The SUPERSHEEN Process can be applied to produce the *precise* result in a *wider* range of work—from *fast* deburring to the *gentle* honing of stampings, castings, forgings and machined parts . . . even where micro tolerances are a must! The "before and after" photo at left is unretouched.**

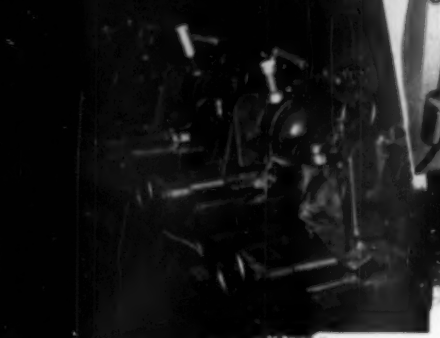
## ALMCO Supersheen

**DIVISION OF QUEEN STOVE WORKS, INC.**

**FACTORY AND GENERAL OFFICES ALBERT LEA, MINNESOTA**

# Save 5 Ways and get BETTER BUFFING





## Appli-matics Apply Buffing Compounds AUTOMATICALLY with the EXPERT'S TOUCH

**[illegible] BUFFS**—The NEW Vander Wal-Wagner Appli-matics reduce wear on buffs caused by too little or too much compound. Foot-treadle or knee-lever control of air-trip enables operator to determine intervals and amount of compound as work progresses. Ideal for polishing lathe or automatic.

**SAVE LABOR**—Buffing compound is applied without interruption of work. Loading of receptacles takes only two seconds—without stopping machine. Full time wheel tender not required, yet Appli-matics permit application to each wheel independently of others in a multiple set-up.

**SAVE COMPOUND**—Appli-matics' receptacles grip your bar right down to the "nubbin" with safety, eliminate waste from overloading, too. A touch of the operator's toe or knee actuates application, by gravity alone, of the correct amount of compound he needs to build a good "face" on the buff.

**SIMPLIFY INSTALLATION**—Any mechanic can install Appli-matics with simple tools. Brackets are universally adjustable to apply to any spot on the wheel. Low-pressure air line permits use of plain hose for flexibility. There are no electrical connections or fine adjustments.

**SIMPLIFY MAINTENANCE**—The only actuating power is gravity, hence there are no complicated motors, gears, switches or other mechanisms demanding frequent attention. The small air-cylinder which trips the counter-balance requires no lubrication. Appli-matics are bronze bushed throughout for long life.

**PRODUCE SUPERIOR WORK**—You get all the desirable results of costly hand application. Your operator uses his training, skill and judgment to build a good "face," applies compounds at any time or at any work position in cam-operated automatics, thus avoids loading of the work. Your "too much or too little" problem is solved. For complete information, see your Wagner representative or send for new bulletin.

**Wagner BROTHERS INC.**

Wagner Bros., Inc., 404 Midland, Detroit 3, Michigan

Send ☐ APPLI-MATIC Bulletin

☐ Name of representative in my area

Name _____ Title _____

Firm _____

Address _____

City _____ Zone _____ State _____

# Don't Forget

In Automatic,
Semi-Automatics,
Barrels,

## You Can Plate Copper

*Faster - Brighter - Smoother*

with

## W·C·M Brite Copper

More prominent manufacturers have installed and converted to this cyanide copper than to any other during the past year.

To meet the increasing industrial demand for a heavier copper plate on a zinc die cast or steel base, join the leaders in adopting the newest of the coppers.

●

For a more permanent, brighter, corrosion resistant zinc plate an increasing number of users are profiting by the lower cost, but maintained quality of

## W·C·M After-Dip Brite Zinc

This is the chemical dip approved and used by leading manufacturers of refrigerator, radio and electrical equipment, toys and other zinc plated parts.

*Write for full information on*

**W·C·M** Brite Copper
**W·C·M** Anti-Pit
**W·C·M** Wetting Agent "C"
**W·C·M** Zinc
**W·C·M** Conditioner
**W·C·M** Purifier
**W·C·M** Paint Base (for die castings or zinc plate)

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ARMALITE CO. LTD
Toronto, Canada

**WIRE COATING & MANUFACTURING CO.**
395 EAST 131st ST. • CLEVELAND 8, OHIO


## NEW PRODUCTS

*(Continued from Page 16)*

### ROTARY CARBIDE CUTTERS REDUCE COSTS ON SHORT FINISHING RUNS

Milling the relief of a slot-type die using conventional methods is usually as expensive as milling the slot itself. After experimenting with various methods, one company finally utilized a Bryer-Schultz No. 1 profile grinder (operating at 16,000 R.P.M.) equipped with a Ford tungsten carbide cutter and report savings in tool cost, time and labor. These cutters are said to maintain shape and size over long runs.

The illustration shows an operator manually relieving the slot (13/32" wide x 11/32" long) in a high carbon, high chrome, tool steel die. The relief necessary for slug clearance is .010" x ¼" from counter drilling to slot length.

The accurate job records kept on this job show considerable savings per die—with the initial tool cost of the Ford carbide cutter greatly offset by increased production.

For additional information and case history studies, circle No. 10 on the attached card.

### AIR-OPERATED PRESS WITH EIGHT STATION INDEX

A new air operated, oil hydraulic press equipped with an eight station air operated automatic dial index table has been announced by Hy-Air Products Company, Jackson, Michigan.

Automatic cycling is accomplished by energizing an automatic reset timer with a manually operated momentary contact switch on the timer. This starts the timer and the down stroke of the press ram. When the preset time has elapsed, the timer de-energizes the solenoid valve controlling the ram and the ram begins its return stroke. At the top of the stroke a one-way dog trips a microswitch connected to the advance side of the index table cylinder, causing the table to advance to the next position. When the next position is reached a microswitch on the table is tripped, restarting the timer and beginning the next cycle.

Besides the eight station index table, 4, 6, 12 or 24 position tables also are available and can be furnished with or without complete tooling. For additional information circle No. 11 on the attached card.

### HANDY REFERENCE TABLE FOR LINEAR CONVERSION

A linear conversion table for handy reference by engineers who frequently wish to convert inches and fractions of inches into decimal parts of a foot has been printed by The Babcock & Wilcox Tube Company. The table is suitable for many purposes in addition to those encountered in the application of steel tubing, the company says. For additional information circle No. 12 on the attached card.

*(Continued on Page 61)*

# New Creations

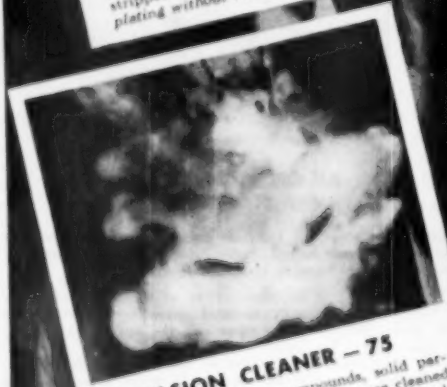
## IN METAL FINISHING . . .

**METAL STRIPPER — A**

An outstanding development for stripping defective electroplated nickel, copper, silver, cadmium and zinc from steel. Fast action — no basis metal attack. The highly polished grill cover illustrated has been completely stripped of nickelplate, and is ready for re-plating without repolishing.

**EBONOL BLACKENING PROCESSES**

Ebonol finishes are used to beautify a widely diversified list of superior quality products. Photo shows steel parts blackened with Ebonol-S and S-30; copper and brass with Ebonol-C; zinc with Ebonol-Z. U. S. Patents — 2,364,993, 2,460,896, 2,460,898.



**EMULSION CLEANER — 75**

Oils, greases, buffing compounds, solid particles, deep seated in steel parts are cleaned out and completely removed by this emulsification process. Stubborn, gummy substances on die castings, milling machines, floors, motor blocks emulsify and disperse in water instantly.

**ENAMEL STRIPPERS**

Enthone has over 20 strippers for removing organic finishes — synthetic enamels, lacquers, vinyls, japans. The best strippers, tailor-made for your particular problem, are selected by laboratory technicians after test runs. This service is rendered free of charge.

FREE: Beautiful [illegible] with step by step instructions for use of Enthone Products and [illegible] tion upon request.

# Enthone Incorporated

[illegible] ELM STREET [illegible] NEW HAVEN, CONN.

## NEW PRODUCTS

(Continued from Page 59)

### ELECTROFORMED PAINT SPRAYING MASK

Close-fitting paint spray masks that are produced by electroforming the metal mask directly over the part to be painted, are available from Vortrod Corp., Brooklyn, N. Y.

A stiff, durable mask is produced by an electrolytic process to conform closely to the surface of the object, thus reducing or eliminating bleeding of edges, fogging, etc.

For additional information circle No. 13 on the attached card.

### POLISHING WHEEL CEMENT

A polishing wheel cement for use with all types of abrasives on all types of metals has been introduced by The Norvel Co., Detroit, Mich.

This cement is reported to resist high temperatures resulting from heavy duty grinding and polishing operations. The material is also useful for recoating belts. For additional information circle No. 14 on the attached card.

### WAX FOR PLATING STOP-OFF

A wax material for selective plating stop-off has been introduced by Michigan Chrome and Chemical Company, Detroit. This material, identified as Miccrowax, is suitable for selective masking on complicated parts, sharp edges, and flat surfaces. No primer is required, and rapid hardening is reported. For additional information circle No. 15 on the attached card.


ACCURACY TO .0001"
IN PRODUCTION SET-UPS

FOR AS LITTLE AS
$117.50

Internal grinding as holes with PRECISE wheel adapter mounting 11/2 D. wheel.

LOWEST COST PRECISION. Wire mounted on standard machine tools, PRECISE SUPER 40 at all speeds from 20,000 to 40,000 R.P.M. insures economic jobs heretofore possible only on stationary machines costing up to 100 times as much.

VERSATILITY. For cylindrical, internal, external and form grinding; for milling with H.S. steel or tungsten carbide wedged mills; for engraving and polishing. Use on wood, glass, rubber, plastics, or any metal including the hardest alloy steel.

DURABILITY. All metal housing, rigid PRECISE quill, lubricant-sealed, micro-precision bearings, ½ H.P. AC-DC motor (115 volts) is protected for replacement frameless.

ATTACHABLE COOLFLEX SHAFT, (optional) Quickly attached for bench work and handheld applications. Same speeds, same precision quill as in PRECISE SUPER 40.

Write FOR CIRCULAR

Milling hardened die with tungsten carbide mill in COOLFLEX ATTACHMENT.

PRECISE PRODUCTS CO., 1302 Clark St., Racine, Wis.

PRECISE SUPER 40



YOU, TOO, CAN—

SPEED PRODUCTION AND CUT ASSEMBLY COSTS...

by this
MODERN Machine Method

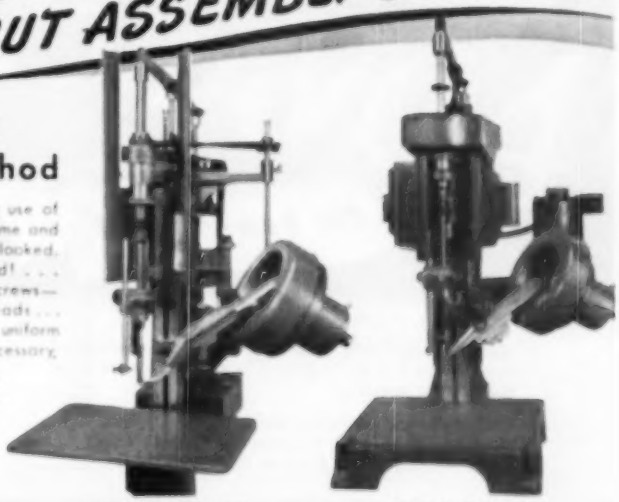
Thousands of manufacturers are profiting by the use of DETROIT POWER SCREWDRIVERS. They offer time and labor saving advantages too great to be overlooked. They will drive screws as fast as one a second!... Machine, wood, brass, self-tapping, sheet metal screws—standard heads, special heads. No marring of heads... no stripping of threads... all screws driven to uniform tension. Hopper fed, no handling of screws necessary.

There's a DETROIT POWER SCREWDRIVER to fit your requirements, three models, bench and pedestal types.

Ask for Catalog

SEND SAMPLE ASSEMBLY FOR PRODUCTION ESTIMATE.

See Us Booth 939, A. S. T. E. Show, Philadelphia, April 10-14.



Model B—Pedestal Type

Model A—Bench Type

DETROIT POWER SCREWDRIVER CO.

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ZINC and ALUMINUM
DIE CASTINGS
• The largest and most modern equipped die casting plant in the New England States.
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THE NE NEW ENGLAND DIE CASTING CO.
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"Everything ADVANCE the Name Implies"
Since 1920
Advanced methods, advanced service and advanced equipment add up to complete satisfaction on your die casting needs.
Our expanded facilities put us in an excellent position to serve you economically and promptly. Inquiries invited on long or short run jobs.
ADVANCE TOOL and DIE CASTING CO.
3764 NORTH HOLTON STREET • MILWAUKEE 12, WISCONSIN

## SPECIAL SHAPES

(Continued from Page 21)

pivoting the two parts. It is doubtful whether parts of this complexity, having the desired degree of accuracy and the necessary strength could have been produced economically by any other process.

It will be noticed that each die casting has a heavier section around the gripping portion in order to provide extra strength. However, the inherent physical properties of the zinc alloy in which they are cast is sufficient for any ordinary stresses to which they are subjected.

Aside from the drilling and tapping of holes for set screws which fall in a plane which does not permit coring, there is no machining. Self - threading screws are used to assemble the tool in order to avoid tapping operations.

Nor is additional finishing required, other than to remove flash left by the die parting.

DIE CAST
DIES
LARGE OR SMALL
•
17 YEARS OF
CONTINUOUS SERVICE
•
1200 TON
HOBBING PRESS
Consulting Engineering and Design Facilities
PRODUCT DESIGN SERVICE
ALUMINUM — ZINC
PLASTIC
Quarnstrom Tool Co.
6698 E. McNichols Road
DETROIT 12, MICH.
Telephone TWINBROOK 1-8888

The castings are given a single coat of paint without requiring a preliminary treatment.

The durability of these tools has long since been demonstrated. Production speeds of 750 to 1000 wires per hour are reported from the field, and even though the tools are subjected to the usual abuse which all hand tools receive, they have held up well in prolonged service.

## NATIONAL PRODUCTION EXPO TO BE HELD IN APRIL

Most complete national picture of new production ideas, machinery, equipment, supplies, raw materials and services which may cut production and manufacturing costs, is the aim of the new National Production Exposition to be held April 4-8 in the Hotel Stevens, Chicago, according to Robert H. Bacon, president of the Chicago Technical Societies Council.

More than 35,000 engineering, production, management and procurement executives are expected for the latest expansion of the former Chicago Production Show, early estimates show.

Innovation of the enlarged exposition will be two theatres which will be used for demonstrations of materials and equipment exhibited and the showing of motion pictures. New scientific and technological developments will be graphically demonstrated.

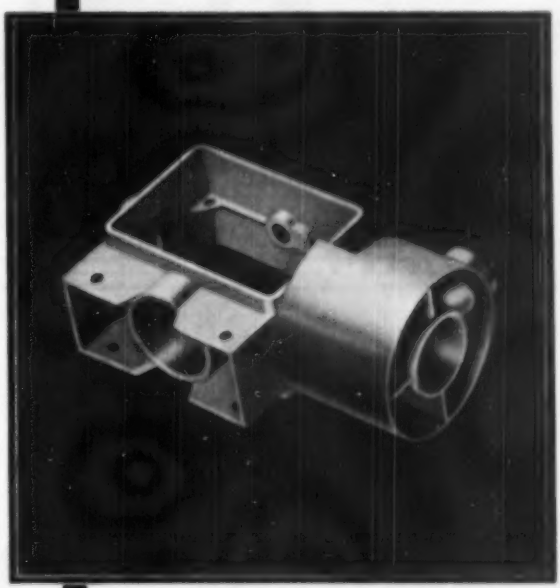
Sponsored by the Chicago Technical Societies Council, composed of 50 technological and engineering societies with a combined membership of more than 20,000 professional and technological men, the show is the development of the first War Production Clinic staged by a few Chicago technological societies at the request of the War Production Board in 1943.

## STANDARD SAMPLES FOR SCIENCE AND INDUSTRY

Nearly 500 different standard samples of chemicals, metals, ores, and ceramics, are prepared, certified, and distributed by the National Bureau of Standards to analytical and research laboratories for use in controlling chemical processes and in maintaining the accuracy of apparatus and equipment. The standard samples are materials which have been carefully analyzed or whose physical properties have been precisely determined at the Bureau and in other laboratories. Some are certified for chemical composition; other are certified with respect to a specific chemical or physical constant—for example, melting point, viscosity, index of refraction, heat of combustion or other properties that are important in scientific research and industrial control.

The NBS program on standard samples has been in existence almost since the organization of the Bureau. The first standards were prepared in 1905, when the American Foundrymen's Association turned over to the Bureau its four sets of standardized pig-iron samples. As the analysis and distribution of these samples pro-


"Cleveland"



INTRICATE . . . BASE . . . HOUSING

● If your product is one that requires the utmost in precision . . . delicate, exacting size and shape . . . don't guess . . . don't take chances. "Cleveland" die castings for Housings or other intricate jobs is your assurance of satisfaction . . . . Write "Cleveland". ●

DIE CASTING DIVISION
The Cleveland Hardware & Forging Co.
Established 1881
3256 E. 79 ST. CLEVELAND 4, OHIO

Ehrco DIE CASTING Service

A consulting engineering organization devoted exclusively to the die casting process.

- Product Design and Development
- Plant and Equipment Installation
- Die Design and Construction
- Die Casting Facilities for Experimental Trial Runs or Production Quantities

The die castings illustrated are the result of our complete facilities to produce die castings economically and quickly.

The Razor die castings involved design of product, construction of dies and tools, casting, plating, packaging and finally shipping.

For any part or all of your Die Casting problems consult with us.

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Ehrco Die Casting Service
303 MAIN STREET
STAMFORD, CONNECTICUT


ceeded under the direction of the late Dr. W. F. Hillebrand, it was soon apparent that there was need for more and more standards, not only of metals but also of ores, chemicals, cements, and numerous other materials. Thus a program that was developed initially to aid analytical chemistry has grown to cover a wide range of scientific work.

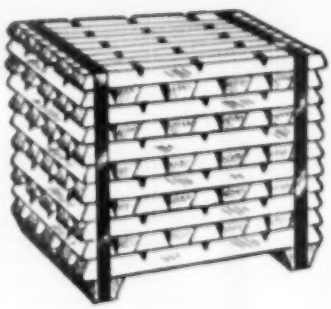
### FEDERATED APPOINTS BLUM

Federated Metals Divisions, American Smelting and Refining Company, has announced the appointment of Leon A. Blum as sales manager of its San Francisco plant. He succeeds Forest A. Wahlheim, retired. At the same time, Donald H. Beilstein was made assistant plant superintendent. The announcement was made in San Francisco by Frederick Walker, general manager of the company's Pacific Coast Department.

Mr. Blum has been with the company for about 30 years.


Zamak Alloy Unit Loading Packages

Think of the convenience of obtaining your ZAMAK (zinc base) Die Casting Alloys as shown in the illustration at right, strapped on consumable runners of the same alloy. SAVES time. SAVES handling. We are in a position to make prompt shipment and guarantee complete satisfaction. A trial order will convince you too.



*Inquiries Invited*

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HYacinth 7-3470

HENNING BROS. & SMITH INC.
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RACINE

ZINC OR ALUMINUM
die castings of highest quality produced on modern, fast equipment. Guaranteed satisfaction. Prompt service.

*Inquiries Invited*
Tell us your needs. Send blueprints or drawings for quotation. No obligation, of course.

RACINE DIE CASTING CO.
801-11 SILVER ST., RACINE, WIS.

# NEWS OF THE INDUSTRY

## GRIES REPRODUCER GETS FOUR REPRESENTATIVES

New representatives in four sales territories have been announced by Gries Reproducer Corp., of 780 East 133 St., New York. They will represent Gries to the industrial field in the sale of small die castings, specialized injection moldings, die cast wing nuts and tubular rivets.

These representatives are: Harry F. Davis, 3262 Warrington Rd., Shaker Heights 20, Ohio, covering Western Pennsylvania, Ohio and Central and Southern Indiana;

William B. Hoey, South Holly Rd., Fenton, Mich., covering the Michigan and Northeastern Indiana territory;

Fletcher Preston, 69 East Division St., Chicago, Ill., covering Chicago, Northern Illinois and Northwestern Indiana;

C. R. Littlefield, 722 Chestnut St., St. Louis 1, Mo., covering Missouri, Southern Illinois, Iowa and Nebraska.

## J. R. MACON JOINS PENNSALT

J. Ralph Macon has recently joined Pennsylvania Salt Manufacturing Company as an engineer in the Market Research Division, it has been announced by George T. Collins, manager of the division.

Mr. Macon, formerly associated with duPont's Electrochemicals Department, will work on market development of new Pennsalt products for the metallurgical industry.

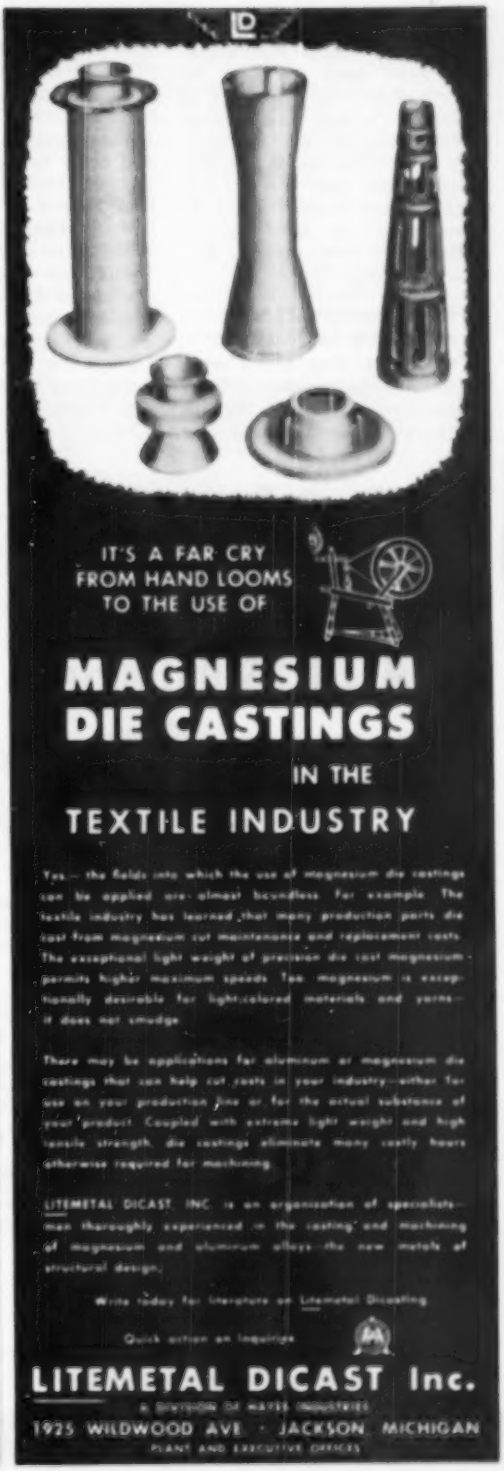
A native of Thomasville, Ga., he was graduated from Emory University in Atlanta in 1941. He is a member of the American Society for Metals.

## S.U.S. DIE CASTING HAS NEW SALES REPS

Recently introduced is a group of sales representatives for the S.U.S. Die Casting Co., 41 East Market St., Logansport, Indiana, specialists in the die casting of aluminum.

These representatives include the following offices of W. Miller Cook Associates: W. Miller Cook and R. Chase, 927 Union Commerce Bldg., Cleveland, Ohio; E. G. Christensen, 1791 Howard St., Chicago 26, Ill.; and Edgar S. Thompson, 5401 N. Illinois St., Indianapolis 8, Ind.

Also included in the list of representatives are: James Degnam, 800 Cadieux Rd., Grosse Point, Mich.; S. F. Coburn, 1010 Cross Lane, Cincinnati 6, Ohio; Peter J. Dapkus, 640 Atalanta Ave., Webster Groves 19, Mo.; James E. Digan, 332 South Michigan Ave., Room 816, Chicago 4, Ill.; and Charles E. Wands, 809 Myers Bldg., Springfield, Ill.



IT'S A FAR CRY
FROM HAND LOOMS
TO THE USE OF
MAGNESIUM
DIE CASTINGS
IN THE
TEXTILE INDUSTRY
Yes — the fields into which the use of magnesium die castings can be applied are almost boundless. For example: The textile industry has learned that many production parts die cast from magnesium cut maintenance and replacement costs. The exceptional light weight of precision die cast magnesium permits higher maximum speeds. Too, magnesium is exceptionally desirable for light-colored materials and yarns — it does not smudge.
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PLANT AND EXECUTIVE OFFICES

### TWO NEW SALES REPS

Two new sales representatives have been named by Aurora Metal Co., producers of aluminum bronze and silicon bronze vacuum die castings. They are: Charles J. Sauter, metropolitan New York and northern New Jersey; and I. R. Jones, southern New Jersey, southeastern Pennsylvania, Delaware and Maryland.

### ESNA ANNOUNCES NEW MICHIGAN SALES HEAD

The Elastic Stop Nut Corporation of America, Union, New Jersey, has announced the appointment of Robert F. Fettig as district manager for the Detroit and Michigan sales areas effective January 1st.

Before coming to ESNA, Fettig was district manager for the McKay Company of Pittsburgh, and prior to that was with the Detroit Diesel Division of General Motors.

An alumnus of the University of Michigan Engineering School, Fettig has also been a flying enthusiast for many years and presently holds commercial single and multi-engine licenses. During the war he served more than three years in the Army Air Force as a bomber ferry pilot with the rank of Captain.

### MARTINO ELECTED DIRECTOR OF ALLEGHENY LUDLUM

Joseph A. Martino, president of National Lead Company, has been elected to the Board of Directors of Allegheny Ludlum Steel Corporation. The two companies recently announced formation of Titanium Metals Corporation of America, a jointly owned company, organized for the development, sale and distribution of titanium metal, its alloys and allied products.

### ELECTS NEW OFFICERS

Acheson Colloids Corporation, Port Huron, Michigan, manufacturers of colloidal dispersions, has announced the election of three new vice presidents.

According to Howard A. Acheson, president of the firm, P. C. Buck becomes vice president in charge of production; M. W. Reynolds, vice president in charge of sales; and Raymond Szymanowitz, vice president in charge of research.

### O. K. TOOL MOVES TO NEW PLANT

Thurston Williams, vice president and treasurer of Williams and Hussey machine company, purchasers in 1949 of the O. K. Tool Company of Shelton, Connecticut, has announced that all manufacturing at Shelton has ceased and is now being conducted at Wilton, N. H.

The tool company, established in 1901, is one of the oldest firms in the metal cutting industry, and will retain its identity and operate as a division of Williams and Hussey machine company.

The O. K. Tool Company was originally organized 49 years


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ago to manufacture the first tool holders with interchangeable tool bits. The bits were made of high speed steel, ground to shape and ready for use with standard shanks of less expensive material. This led to the development of inserted blade milling cutters, gang cutters, dual adjustment face mills, end mills and multiple operation tools for boring, facing and chamfering at one time. During World War II, O. K. engineers sponsored new type cutters with carbide blades.

### DOW TRANSFERS CALDWELL TO ATLANTA OFFICE

Donald Williams, director of sales, The Dow Chemical Company, has announced that T. H. Caldwell, Jr., former manager of die casting sales for the magnesium division, has joined Dow's chemical sales staff at the new Atlanta, Georgia, sales office.

Mr. Caldwell, a graduate of Michigan State College in chemical engineering and of the Dow Training Course, began work at Dow in 1940. Prior to his appointment to the Atlanta office he was engaged in magnesium production control and sales.

### NAMED TRAFFIC MANAGER BY STEWART-WARNER

Appointment of Robert C. Stockton as general traffic manager of Stewart-Warner Corporation has been announced by R. F. Stiles, director of purchases. Stockton fills the position left vacant by the death of E. F. Stecher.

A native of Chicago, Stockton has been active in the traffic and transportation field for more than twenty-five years. He began his traffic work, upon his graduation from Princeton University, with a trucking concern founded by his great-grandfather in 1857.

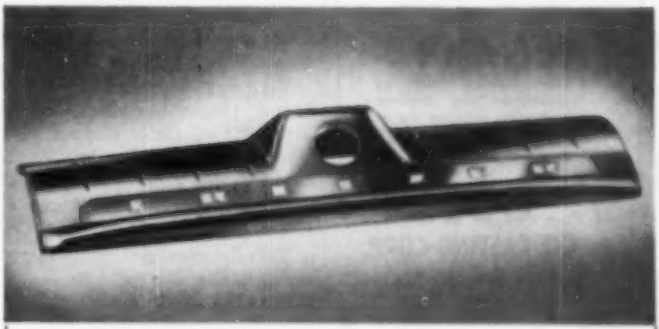
He was subsequently assistant traffic manager of Montgomery Ward and Company and during the war was senior transportation specialist with the Office of Defense Transportation. In 1946 Stockton joined Slick Airways, becoming central division manager of sales and traffic, the position he left to join Stewart-Warner.

### NAMED PENNSALT PRODUCTION MANAGER

Hugh C. Land, assistant to the production manager of the Pennsylvania Salt Manufacturing Company, has been appointed production manager as of February 1, it was announced by William F. Mitchell, vice-president in charge of manufacturing.

Previously, Mr. Mitchell explained, the function of production manager was combined in his office. Increasing activities, however, necessitated the separation of the functions of administration and production management.

In his new capacity Mr. Land will exercise general supervision over operation of the manufacturing facilities in the parent company, including utilities.

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## METALS COMPANIES USE NEW INVENTORY PRICING

Nine out of 16 non-ferrous metals companies used the "Last-in, first-out" (Lifo) method of inventory pricing last year, according to "Accounting Techniques Used In Published Corporate Annual Reports," a study published by the American Institute of Accountants.

The Lifo method is based on the assumption that the goods sold will be at the price of the most recent purchases.

The nine companies who used all or a part of the Lifo method were: The American Metal Co., Ltd., American Smelting & Refining Co., Anaconda Copper Mining Co., Chile Copper Co., Continental Can Co., Inc., General Cable Corp., Kennecott Copper Corp., Revere Copper & Brass, Inc., and Scovil Mfg. Co.

The Revenue Act of 1938 restricted the use of Lifo (also called the "elective method") to the non-ferrous metals and leather tanning industries. The use was extended in 1939 and now 96 out of 525 major companies in all industries use this method.

## ALLIED RESEARCH BUYS HOFFMAN COMPANY

As part of an expansion program to increase the company's line of metal finishing chemicals, Allied Research Products, Inc., Baltimore, has purchased the R. A. Hoffman Chemical Company, Cleveland.

In announcing this acquisition, H. C. Irvin, president of Allied Research said that R. A. Hoffman, formerly owner of the Hoffman Company, has joined Allied Research and will be in charge of the development of new types of organic finishes.

For the present, Allied Research will maintain Mr. Hoffman's former research laboratory at 224 High Street, Cleveland, as a branch of their Baltimore research division. However, his activities will be transferred to Baltimore when new laboratories are completed.

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### ADDRESSES FOUNDRYMEN

R. A. Colton, research metallurgist of Federated Metals Division, American Smelting and Refining Company, addressed the Wisconsin regional meeting of the American Foundrymen's Society in February at the Hotel Schroeder in Milwaukee, and he also spoke before the Pittsburgh Foundrymen's Association.

### BARREL CHROME PLATING

*(Continued from Page 46)*

It should be emphasized that rack cost and maintenance have been ignored in the discussion about plating prices. This makes the case for barrel plating considerably stronger when it is realized that racks to hold small parts are quite expensive. Also because of the many contacts, maintenance is high — much higher than for racks built to hold larger pieces. *As no racks are required in barrel chrome plating, this item can be eliminated from all cost calculations.*

Parts with flat surfaces are the most difficult to plate. This type of part has a tendency to slide along the flat surface, will not tumble readily in the barrels. The comparative results, therefore, are poor when compared to those parts which have rounded surfaces. Obviously, the latter type part rolls more easily and it is possible to get a much better finish on it.*

This barrel chromium plating development should be a boon to the die casting industry as a whole. One profession that it will certainly help is that of the designer. It will be no longer necessary for him to consider how a small die casting must be racked.

As mentioned earlier, *the die caster can now compete with many small steel or brass screw machine parts since he, too, has available a low cost bulk method of chromium plating.* Furthermore, the die caster can quote a fair price on a small chromium plated die casting without feeling that he is out of line due to an excessively high finishing cost.

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chromium plating on small die cast parts that may be discussed briefly here is that pertaining to wear resistance. There are a number of cases where steel pinion and component parts are now being used because of their resistance to wear.

These steel pinions must be made on a specialized piece of equipment at relatively high cost. A die cast pinion could be substituted at a great saving. The only difficulty is that the raw die casting is comparatively soft and will not provide the wear resistance that is required. A chromium plated die cast part is a different matter however, and work along these lines is now in progress to determine the comparative merit of a barrel chromium plated die casting as compared to steel for wear resistance.

There is nothing new or unique about barrel plating zinc base die castings—these have been copper and nickel plated in barrels for years with great success. However, the tying together of all the component operations, namely, copper, nickel and chrome barrel plating into one process or service is a comparatively new development. It is hoped that this method of finishing will result in more widespread use of chromium as a finish since it can be brought within the range of the average budget.

*Editor's Note: Perhaps the best solution to the question of what parts can or cannot be barrel chrome plated is to take advantage of the offer extended by Midwest Chrome Process Co. This is to forward samples to the headquarters of the company, 2627 Magnolia Ave., Detroit 8, Mich., for trial plating. There is no charge for this service. Parts are plated and returned for examination and test of the finish produced.

## LETTERS TO THE EDITOR

*(Continued from Page 6)*

ings. Would you please supply the writer with the name and address of the manufacturer?—W.R.G.

*The Cameron portable dishwasher which operates on a tur-*

*bine principle, using no electric power, is manufactured by the Cameron Corporation, 2066 East 70 St., Cleveland, Ohio.—Ed.*

### SHRINKAGE OF ZAMAK ALLOY

I am interested in learning the amount of shrinkage per foot of Zamak.—E. W.

*The following is an excerpt from the booklet, "Zinc Metals and Alloys" published by The New Jersey Zinc Company: "Because of the drastic chilling involved in die casting and the fact that the solid solubility of aluminum in zinc changes with temperature, the Zamak alloys undergo a change which results in a shrinkage on aging. This shrinkage is about two-thirds complete in a few weeks and is so slight that it can generally be ignored. The average shrinkage for air-cooled Zamak alloys expressed in inches in 6" is as follows: Zamak 3, 0.0039" and Zamak 5, 0.0054".*

*Solidification shrinkage for both alloys is given as .14 inches per foot.—Ed.*


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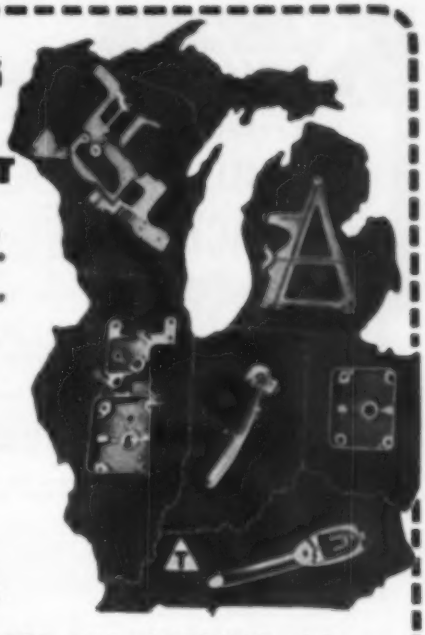

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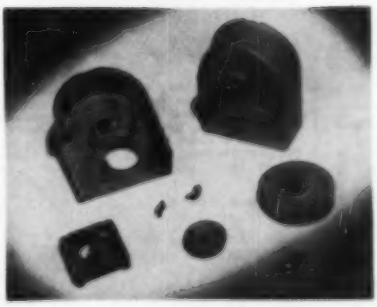

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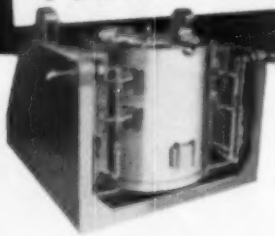

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**SELECTION TABLE**

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|---|---|---|---|---|---|
| TILTING | Crucible | 2500 F. | TCB | Brass and Copper | TC-45 |
| | | 1600 F. | TCA | Aluminum | TC-45 |
| | Pot | 1400 F. | TP | Aluminum and Magnesium | TP-45 |
| STATIONARY | Crucible | 2500 F. | CB | Brass and Copper | CB-45 |
| | | 1600 F. | AC | Aluminum | AC-45 |
| | Pot | 1400 F. | AM | Aluminum | AM-45 |
| | | 1300 F. | SM | Soft Metals | AM-45 |
| | | 1000 F. | SA SAV | Soft Metals | SV-49 |

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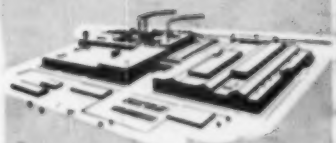

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